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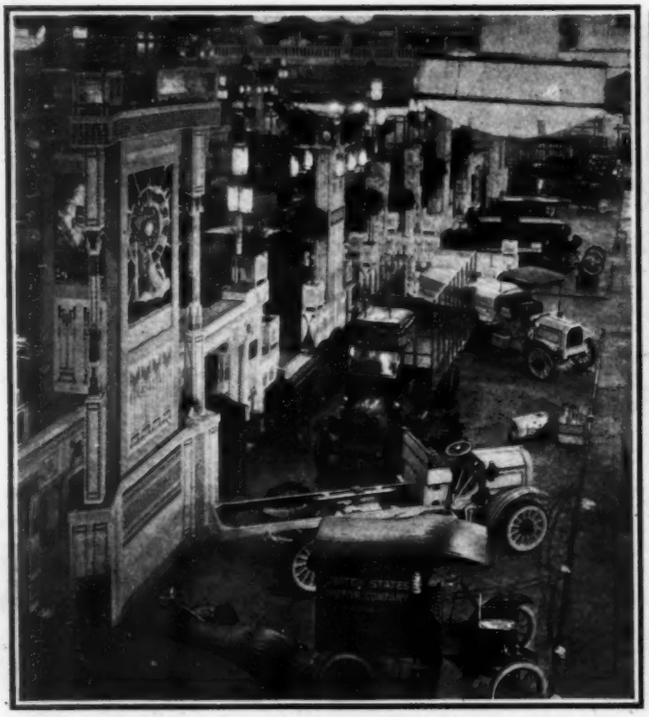
THE AUTOMOBILE

Motor Trucks Reign at Chicago

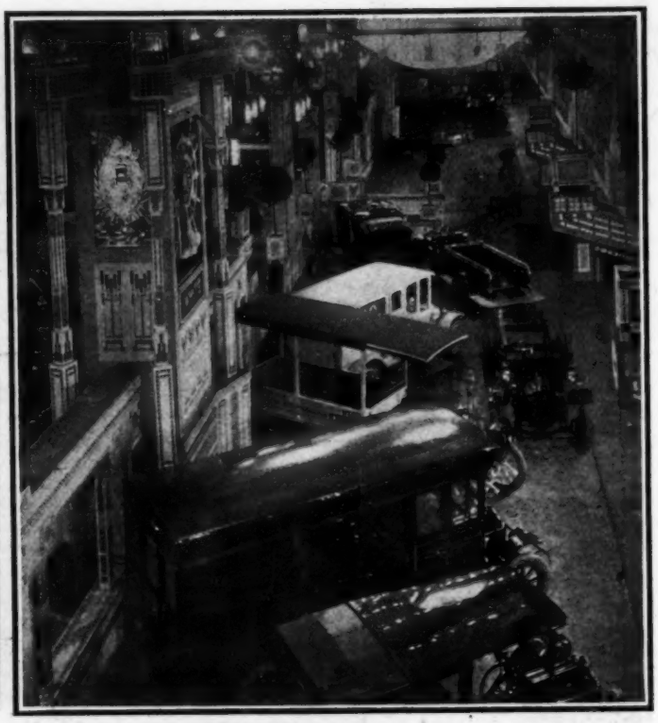
VIEW FROM GALLERY AT COLISEUM, CHICAGO, SHOWING COMMERCIAL CARS

CHICAGO, Feb. 5—The largest commercial vehicle exhibition ever presented to the American public was opened this afternoon at the Coliseum under the auspices of the National Association of Automobile Manufacturers. There are eighty-two exhibitors of commercials as against fifty-one for the preceding year, an increase of nearly 38 per cent. The total number of commercial car exhibitors at both the Grand Central Palace and the Madison Square Garden in New York was seventy, thirty-seven of these being at the Garden and thirty-three at the Palace. At the two shows, then, there have been 162 exhibits of commercial cars, but of this number some have been at both shows. Eliminating those which have been counted twice, there have been 100 separate makes of power wagons placed before the buyer this year at the principal shows in the two centers.

The new makes of cars seen in Chicago for the first time are: Whiteside, M. & P., Dart, Bessemer, Commerce, Service, Diamond T, Law, Blair, Poss, Baker, Locomobile, Brush, Gramm, General Motors, Staver, Lozier, Autocar, Premier, Atterbury, Best, Dorris, Buick, Walker, Stegeman, Sanford, Herbert, Dain, Lauth-Juergens, Packers, A. O. Smith, Old Reliable, Motor Wagon, Natco, Mogul, Modern, Indiana, Mercury, Wilcox, Speedwell and Velie. Those who are not showing are Mais, Hart-Kraft, Studebaker, Courier, Overland, Atlas, Chicago Commercial, Economy, Marquette and Brodesser.



East side of Coliseum, showing Gramm, Brush, Peerless, Waverley and Avery



West aisle of Coliseum, showing White machines exhibited in the foreground

There are no freaks in the show this year; although there are many novelties of construction they have only been brought out after due consideration as to their practicability and worth. The monstrosity and peculiarities of the earlier days have gone by the board. Some mechanical designs characterize practically everything seen and their critical engineer will have a hard job to locate weak points in the cars before us. He may find many points to criticize but in most cases it is doubtful if his judgment in the matter is any better than that of the man who designed the questioned part or parts.

Great Variety of Body Types

A great variety of body types have been brought out for the year. Furniture, brewery, coal, fire, ambulance, meat and small merchant wagons are here in profusion. Leading examples of the furniture type are the Peerless and White. These constructions at first sight appear to be over large. A careful analysis shows that they have been kept nicely balanced and in the Peerless in particular the body is arranged so that the overhang in the rear is approximately the same as the distance from the axle to the front of the body.

A leading brewery type is that shown by Pierce, in which the side members are made entirely of hollow electric welded steel construction. Single pieces extend from the top of one side to the other. No rivets are used in the construction.

Alco bodies are also of electric welded steel construction and here, too, no rivets are to be seen. Leading tendencies in steel body construction are in evidence. This work has advanced to a marked degree within the last year. It seems that wood body construction has a strong rival. The ambulance has received some attention by the White company and a very good example has been brought out. Springs and hangings in this type of car must be carefully considered and worked out. Fire trucks of various types have been brought out by Knox, Pope-Hartford, Kelly, Harder, and Locomobile companies. The Locomobile and Kelly propositions are hose wagons, while the Knox people have a combination pump and chemical, the power for which is obtained from the driving motor. Pope-Hartford and Harder type are combinations chemical and hose. Buses, large and small capacity, seem to be on the increase. White is here again the leader and is followed by several of the smaller makers. The meat wagon field is larger and there are three examples, these being the Harder, Kelly and Atterbury. While others have not shown this type, many are considering the demands of this business and are designing accordingly. Tank wagons by Peerless and White are interesting and show the tendency in this direction. The Kelly has even gone so far as to construct tower wagons for the use of railways. The small merchant has not been forgotten; many types of meat wagons, laundries, furnishing goods, and the like for his special use. In fact, every branch of the business world can be supplied with machines.

There are few convertible wagons; in nearly all cases trucks are designed as trucks and all have realized that no matter how well suited a passenger vehicle is for touring work it cannot be utilized in the construction of a truck.

Along with the development in the gasoline vehicles, electrics have kept pace. In the Detroit, Waverley, Baker, General Vehicle, Lansden, M. & P., and Walker designs the battery is placed in the center of the frame, the motor being in the rear of this. A new design has been brought out, however, by the Rapid people who have placed the battery box in the front on the top of the frame. This they claim prevents mud and water from getting at the terminals and causing trouble. The seats are placed over this battery box and the motor is placed in the rear. This construction is a pioneer in its field. Several types of batteries are supplied by the makers, among which are the Edison, Iron-Clads, and Exide, although the equipments in this respect are not standard.

Left-Hand Control Gaining

This year more than ever, the left-hand control is in evidence. There are about half as many models which have this type of control as there are which have the right hand, which speaks very well for this newer construction. The makers who have adopted it almost in every case will tell you that the driver is afforded a better view of the side of the road which he should see, and time is thus saved over the right-hand control.

A list of 1912 cars with various types of control follows:

Right Hand Control

Autocar, 1½ T.
Alco, 2, 3½, 5 T.
Atlas, 2 T.
Atterbury, 2, 3 T.
Avery, 2, 3 T.
Aries, 7 T.
*Best, 800 Lbs.
Bessemer, 1 T.
Blair, 1½, 2½, 3½ T.
B. O. E., 3, 6 T.
Board, 1, 2, 3 T.
Brodosser, 2, 3 T.
Buick, ¾ T.
Cameron, 800 lbs., ½ T.
Cartercar, ¾ T.
Chase, ¾, 1, 1½, †2 T.
*Commerce, ½ T.
C. P. T., ¾ T.
*Despatch, 600 Lbs., ½ T.
*†Dorris, ¾ T.
Decatur, 1½ T.
Franklin, 1 T.
Glide, ¾ T.
G. M. C., 3½, 5 T.
Garford, 1½, 3, †5 T.
Gramm, †1, 2, 3, 5, T.
Ideal, *½, *¾, *1 T.
*Indiana, 1½ T.
Kelly, 2, 3 T.
Kissel, 3, 5 T.
Knox,, 2, 3, 4, 5, †6 T.
Lambert, ½, 1, 2, 3 T.
Lauth-Jergens, 1, 2, 3 T.
*Law, 1½ T.
Lincoln, 800 Lbs.
*Locomobile, 5 T.
Longest, *3, *5 T.
Lozier, 4, *5 T.
McIntyre, 800 Lbs., ¾, 1, 1½ T.
Mack, 3, 4, 5, 7 T.
Mercury, ½ T.
Modern, 2 T.
Moeller, 3, 5 T.
Mogul, *2, *4, *6 T.
Monitor, ¾, 1 T.
Morgan, 2, 3, 5 T.
Packard, †2, 3 T.
Packers, 2, 3½ T.
Peerless, 3, 4, 5 T.
Pierce-Arrow, 5 T.
*Poss, ½ T.
Progress, *1½, *3 T.
Regal, ½ T.
Reo, ¾ T.
Rowe, *¾, *2 T.
Saurer, 4½, 6½ T.
†Sampson, 5 T.
Schmidt, ¾, 1 T.
Staver, ½ T.
Sanford, 1 T.
*A. O. Smith, 3 T.
Universal, 3 T.
Velie, 1½, †3 T.
Victor, 3, 5, 7 T.
Walter, 1½, 2, 3, 3½ T.
White, ¾, 1½, 3 T.
Whitsides, ¾, 1 T.
Wilcox, 1½, 3 T.

Left Hand Control

Adams, 1 T.
Atlas, ¾ T.
†Atterbury, 1 T.
Brush, 600 Lbs.
*Dain, 2 T.
Dayton, 2, 3, 5 T.
*Dennison, ¾ T.
Federal, 1 T.
Ford, 750 Lbs.
G. M. C., 1, 2 T.
Grabowsky, 1, 1½, 2 T.
Herreshoff, 750 lbs.
Hewitt, †1, †1½, 2, 2, †3½, †4½. †5½, †7, 10 T.
*Dain, 2 T.
†Kelley, 1 T.
Knickerbocker, *3, *5 T.
Law, *1, 1½, 2 T.
Le Moon, 1, 1½ T.
*Lippard-Stewart, ¾ T.
Mack, †1, †1½, †2 T.
Mais, 1½, 3 T.
*Mora, ¾ T.
*Motor Wagon, 800 Lbs.
†Natco, 1 T.
Newark, *½, *¾, *1½ T.
Oliver, ¾ 1½ T.
*Pope-Hartford, 3 T.
Sampson, ½, 1, 1½, 2, 3 T.
*Sandusky, 1½ T.
Schacht, 3 T.
Speedwell, 4, 6 T.
Stearns, 3 T.
Stegeman, 1, 2, 3, 4, 6 T.
Sullivan, ½, ¾ T.
U. S., 1½, 3 T.
Veerac, ¾ T.
†White, 5 T.

*New maker. †New model.

Worm vs. Shaft Drive

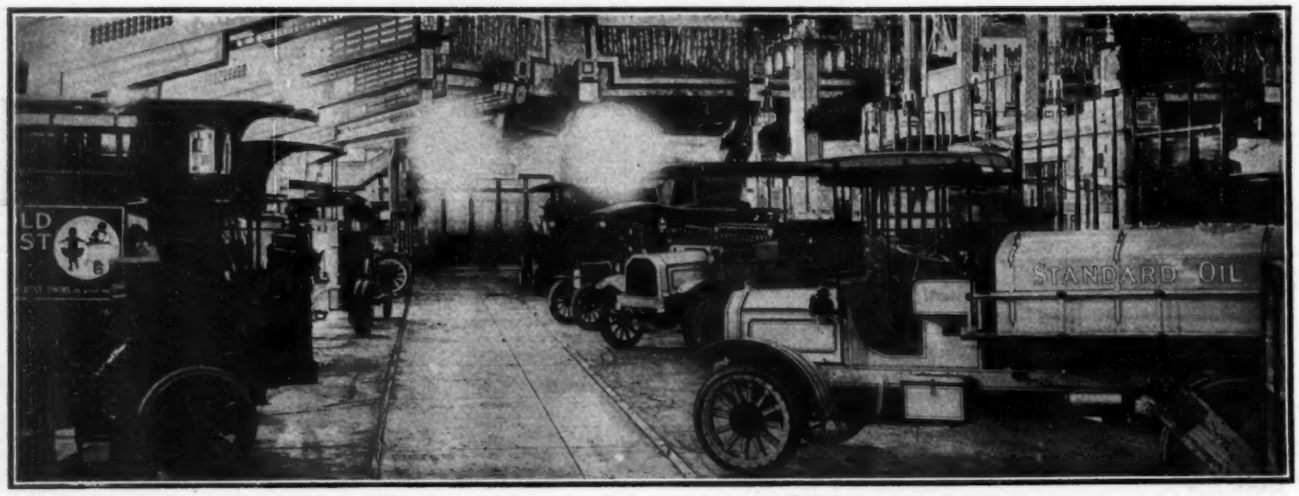
Metal wheels are receiving more attention this year. Locomobile, White, Morgan, and A. O. Smith have adopted one type or another on their heavier models. The latter, which is a new addition to the truck industry, has its metal wheels furnished with spokes which are of the U-section, the inside being open. This is done with the idea of eliminating unnecessary metal, thus lightening the construction.

Many makers believe in housing the chains which convey the power to the rear wheels. Among these are Lozier, Mack, Sampson, Sandusky, Stegeman, and Natco. While it may be claimed that this inclosing of the chains decreases accessibility, the makers have met this criticism by making them easily removable. Removable cover plates have also been placed in these housings so that the sprockets and jackshaft bearing may be gotten at very easily. Morgan goes still farther and places a chain guard over the working gears on special dump trucks.

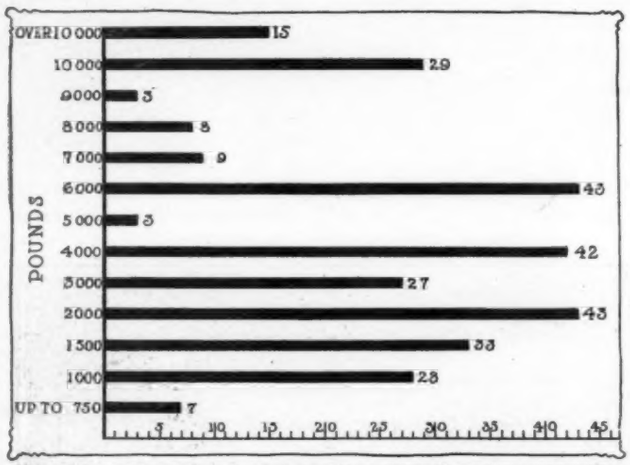
The problem of conveying the power to the rear wheels is in most cases solved by the use of jackshafts and side chain, although the worm and shaft types also have their adherents.

While the drive by shaft through spur gears does not seem to be gaining ground, the worm drive is the leading tendency This year, in addition to the Pierce, the Newark, A. O. Smith, Stegeman, Blair and Dain people have joined this class. Worm drive seems only in its infancy and whereas the early types,

View from balcony, looking south on the center aisle of the Coliseum. On the right side of the aisle are Mack, Saurer, Reo, Kelly and Pope-Hartford; on the left side of the aisle are Packard, Locomobile, Garford, Walker and others



Looking south on the east aisle of Coliseum, showing Reliance exhibit at left, and Peerless, Brush and Gramm at right



Showing number of makes of gasoline cars of various capacities

which utilized this construction were not successful because the pitch angle was too small, later investigation seems to warrant its more extensive use. Following is a list of the vehicles whose power is conveyed to the rear wheels by worm or shaft:

Worm

A. O. Smith
Blair
Commercial Electric
Dain
Newark
Pierce-Arrow
Rowe
Stegeman

Shaft

Argo Electric
Atlas
Autocar
Blair
Cameron
Dennison
Dorris
Ford
Franklin
Garford
Glide
Herreshoff
Hupp-Yeats Electric
Ideal
Lippard-Stewart
McIntyre
Monitor
Newark
Ohio Electric
Oliver
Regal
Staver

The questions of mounting, which imply consideration of the position of the worm over the worm wheel, the demountability, number of threads on a worm, and the type of worm wheel, are open questions with many of the makers at the present time. Lack of knowledge and experience with type of construction have no doubt caused many to hold off in bringing it out. Within the year there will no doubt be several more examples of the worm drive brought out.

In the Pierce worm drive the worm thread is of quintuple type with pitch of 5 15-16, the end thrust is taken by a double row of thrust bearings, while the shaft works on two annular ball bearings, one mounted on either side of the worm wheel.

One of the newest of these types is the Dain, which is made demountable from the top and it is impossible to remove the worm without taking the worm wheel out also. This may be said of the Pierce construction as well as that of the Blair. The Dain is a triple-thread type as well as the A. O. Smith. Twenty-seven teeth are placed on the Smith worm wheel and thirty-nine on the Pierce-Arrow. The A. O. Smith is made removable by taking out the rear flange bolt; a separate casting which forms a housing for the worm and worm wheel is then made removable in its entirety. A double thrust bearing and two annulars on the worm shaft also appear in this construction. Provisions for oiling have been carefully worked out in all these constructions, and in all cases they show the advance of modern construction has dictated. The Blair type of worm has four threads of the Hindley type and the outside diameter has been left full, the reason being that there is no loss of strength of bearing surface by this design. A 28-degree angle is used and there are four separate and distinct bearings, two on either side of the worm wheels. One of these on either side is a thrust bearing while the other is an annular. The worm is made demountable from the rear by the removable of two holding bolts and two housing bolts. In the A. O. Smith construction the angle is also 28 degrees, which is the Lanchester design.

Friction Transmission Holds Its Own

Friction transmissions hold practically the same status as formerly, among the examples exhibited at the show being the Cartercar, Best, Stephenson, Dain and Service. The last of these three have a double friction arrangement in which either three or four disks are employed, while there are those engineers who advocate the friction transmission, it is not favored by a great number. The distinct points in its favor are, perhaps, not so great as those of other types, although chassis construction is simplified and the range of speed change is of course infinite.

A good example of flexible frame construction is that of the Pierce. There are no cross members tying the sides of the frame together. Each side frame member is separately suspended, which allows for variations in body position without in any way affecting the other side.

There seems to be a tendency to increase the diameter of the jackshaft brake as it has been found in many cases to be inadequate to the service to which it is put. Another leading point of design seems to put the service brake on the rear axle and the emergency brake on the jackshaft, which is exactly the opposite of the earlier construction.

One thing which the displays bring out prominently is that more and more thought is being given to the matter of making comfortable the man who must handle the machine, and in the last analysis, be responsible for its repair bills. This is brought out in many ways; pedals and levers are designed with more

thought of the men who will use them, many being adjustable, while steering wheel diameters and sections bear a close ratio to the capacity of the truck.

While there is still much difference of opinion as to the vertical or inclined steering post, the usual relation of wheel to the seat is about the same for all cars, having reached a semi-standard position with an average vertical distance of 8 inches and a horizontal of 1.4 inches. This allows the driver about 8 1-4 inches of leg space. Wheels will always vary in size, but for the smaller capacities, 18 seems to be the favorite while a canvass of the heavier trucks including the newcomers, show a majority with 22 inches. Sections remain small, with 1 1-2 to 1 3-4 the average long diameter.

Large Levers Are Not Needed

The greatest disparity is found in shifting and brake levers, pedals approximating a standard relation of 18 inches from seat edge to center of pedal pad, with few below 17 and none over 22. The hinged pad, too, is increasing. Levers cannot be compared in a general way, except to say that while the total lengths are far apart, the distance above the footboard is approximately 20 inches for the gear shifting lever and 23 for the emergency brake. Many manufacturers have made the mistake of supposing that a huge lever was needed because the vehicle was large, bulky and carried an enormous load.

Following the example of a well-known Northwestern maker, Wilcox, in the matter of complete inclosure for the driver, a number of these are to be seen, including Lauth-Juergens, White 'bus and ambulance, Buick 'bus, Mercury tea wagon and a few others. On the highest type of 'bus this would be expected, but its use on regular platform, panel and other types of body is a departure. On the lowest priced cars, all kinds of top, windshield or curtain protection against the elements is extra, but on all of the better cars, the driver is well cared for at the chassis price. At Chicago some forty windshields were seen, of which just half listed this important part as an extra. This price covers body roof extensions which project far enough beyond the dash to be effective against driving rain or snow, and include side, front and rear curtains with celluloid windows, side panels with glass windows and extra curtains, as well as a number of minor refinements.

Attention should be called to one thing, however. Not enough of a seat back is provided. A simple lazy back with a narrow cushion of less than 6 inches width cannot be called comfortable by any stretch of imagination, but a surprisingly large number of firms provide this kind and nothing more. On a few cars, an extremely low upholstered seat back was found, several of those measured at Chicago being as small as 5, 6, 8 and 9 inches.

Many types of dump bodies have appeared this season, the Sampson, Morgan, Mack, Speedwell, Pierce-Arrow, Alco, types are interesting and each has attacked the problem of quick-load removal in a different way. Power winches, reducing gears, and various other devices have been utilized. The Mack is the leading example of the power winch construction, while the Sampson makes use of a compressed air device for raising the front end. Tail boards have received consideration and in nearly every case they are so constructed as to raise automatically with the raising of the body.

Small Trucks Increasing Rapidly

The small car is on the increase, and the diagrams which appear with this article bring out clearly the numbers of cars manufactured of each carrying-capacity class. It will be noticed that the small truck having a capacity of about 1-ton and the 3-ton types are the leaders, there being about forty-three makers of each class. The smaller cars with a capacity of from 1,000 to 1,500 pounds are not far behind. There are thirty-three makers of the 1,500-pound class. Seven types of car below 750 pounds are now on the market, which shows an increase of about 50 per cent. over the preceding year. It is rather remarkable the number of types of as 5-ton capacity, they outnumbering the 1 and 1 1-2-ton type. In the electric field the smaller vehicle of 1-2-ton capacity is in the lead, while the 1-ton type is not far behind. There are three or four makers of electrics who have courageously put out a type of 3 to 5 ton. Increase in the efficiency of storage batteries and the perfecting of motor construction have been largely responsible for the gain in the electric field.

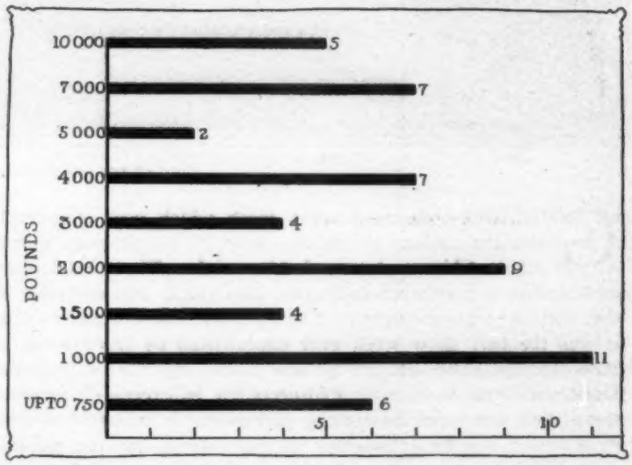
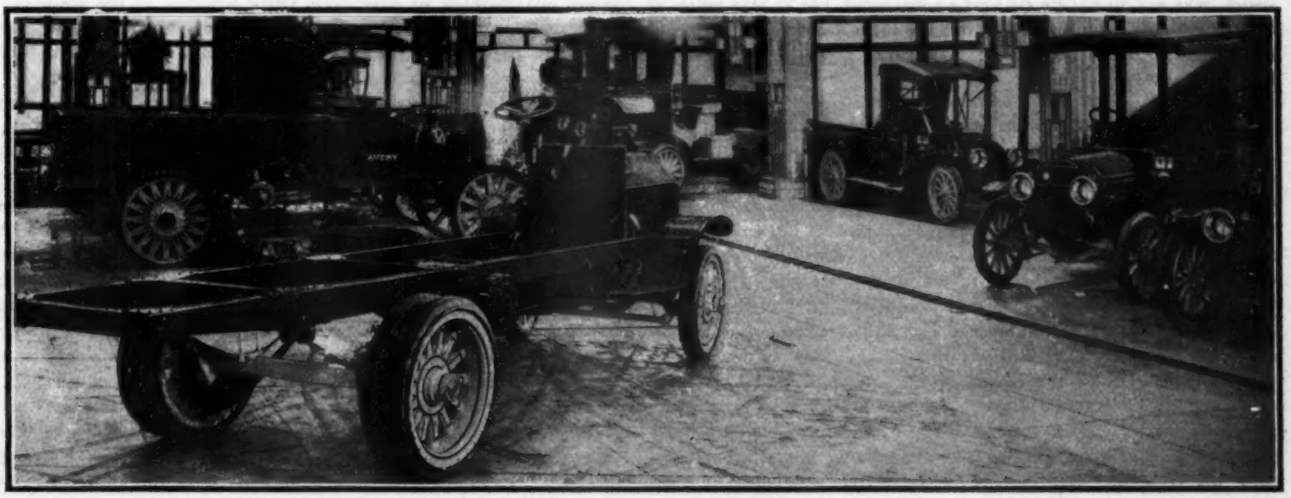


Diagram of number of makes of different-sized electrics



Looking along the eastern aisle, with a close view of the Avery and Kissel exhibits

One of the most pleasant social affairs during the first week of the Chicago Show was the banquet

First Week of Chicago Show

Many Wholesale and Retail Sales—

CHICAGO, Feb. 4—After a week which was remarkable for the amount of business done the pleasure-car section of the Chicago show ended last night. The great amount of business, not only wholesale but also retail, was recorded by the various representatives. The opinion was unanimous that it was the best show week ever experienced by the makers of pleasure cars, either here or in New York. No cases of dissatisfaction were to be found. Prospects far in excess of expectations were numbered among the gathering. It will take several months for the local branches of the various cars to exhaust their supply of prospects and a profitable spring is predicted.

The attendance of the week, according to Manager S. A. Miles, was not in excess of that of last year, but it was equal at least. Thursday night brought out the largest crowd of the week and even in the afternoon and morning dealers from out of town held sway.

Accessory Exhibitors Remained Over

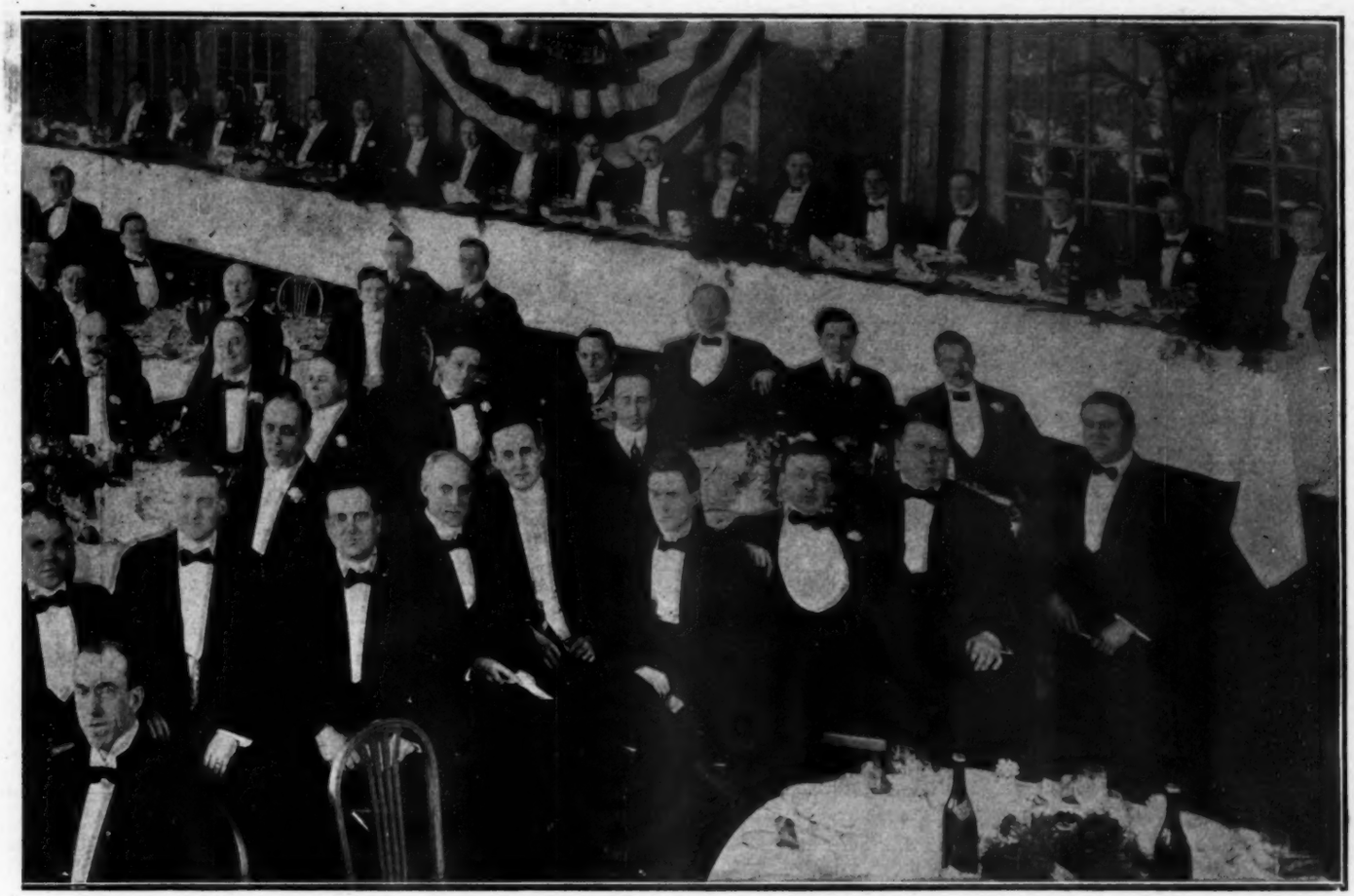
After the close of the show at 10.30 Saturday night the pleasure cars made a sensational exit and within 2 hours the entire Coliseum was emptied of its visitors of the week. Decorations were left intact and the only changes made for the commercial section were in the changing of signs over the booths. Immediately after the cars had been taken out a small army of painters was set to work painting the floors and making them ready for the reception of the commercial-car exhibits. As to the accessory exhibitors, nearly all of them remained, the only withdrawal being that of the Hayes Manufacturing Company, which was showing bodies for pleasure vehicles. A number of makers in the annex, however, left to make room for the motor-cycle exhibitors. The basement of the annex was not put in readiness for commercial-car reception, but from the large increase this year it will have to be brought into service next year.

The retail sales on the whole were specially heavy, although the majority of them were from out-of-town sources. These buyers came along with the dealers from nearby cities and towns and much is due to these dealers for the large amount of business done.

As to the exhibitors themselves, the Pierce-Arrow people, while not claiming to have done more business at the show than a year ago, appear to be well satisfied with the results obtained. To them the outlook is very gratifying and they have a large array of prospects.

The Rambler agents state that more business has been done by them than by any of the other exhibitors, and they claim that they have sold 187 cars as a direct result of the show. This is compared with 175 of the previous year. The large number of sales is due to the fact that the Rambler people have concentrated all their efforts on doing business during show week. At their booth twenty men were in attendance, while there were ten more at the local branch, and still another ten employed in conducting prospects to and from the Kenosha plant. The company estimates that nearly 400 people took part in these excursions to the factory. Much new territory was appropriated and the Rambler company appears well pleased.

Three new agencies and thirty-five cars sold at wholesale are claimed by the Hudson agents, in addition to the large number of promising prospects. The Chalmers company reports that its model 36 is very popular and is pleased with the show in every way. Lee Counselman, general manager of the company, stated



given on February 1 at the Sherman House by the Chicago Automobile Trade Association

a Record-Breaker for Business

Social End of Show Pleasing Feature

that, in his opinion, the greatest value of an automobile show does not lie in the retail sales of the week, but rather in the prospects for future business which are developed. Missionary work is done among hundreds of visitors and the immediate sales are not numerous in the first place, but when once made that is the end of them. He states further that the prospects which are developed stand for the business of the future and that in getting these prospects the present show was the most valuable he had ever attended.

While not attempting to do anything but a retail business at the show, the Columbia company took care of the dealers who came by conveying them to the local branch where matters could be arranged more satisfactorily without interruption. Eight Knight cars were sold by them. The Alco made about the same number of sales and took care of a great number of interested dealers. A representative of this company stated that in his opinion their business was twice as good as that done a year ago at the show. The Premier people also did a large retail business, the show being instrumental in disposing of fourteen of their machines. The Locomobile agents sold seventeen and the Stevens-Duryea representatives sold some additional territory and did considerable retail business. The Stearns, Garford, Peerless, Lozier and Cole companies reported large increases over the preceding year.

C. T. Jeffrey of the Rambler company gave it as his opinion that the show just closed was by far the most important yet held because there had been more actual sales made and the tendency toward standardization had culminated in the stability of design. Freak design seems to have disappeared, he said, allowing the buyer to choose from the merits of the real products before him, rather than from literature, which is often misleading.

B. C. Day, manager of the Alco branch in Chicago, was enthusiastic over the week's results for his company and stated that they more than reached the expectations set. One reason which he gave for the success of the exhibition was that it drew visitors from more than half of the country.

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Board of Trade Banquet a Feature

CHICAGO, Feb. 2—The striking feature of the annual banquet of the Chicago Automobile Board of Trade, which was held last night at the Sherman House, was the appearance of a large number of prominent automobile manufacturers. With the exception of those given by the National Association, it is doubtful if any similar affair ever attracted so many men high up in the industry.

S. A. Miles, general manager of the National Association of Automobile Manufacturers, presided over the speakers' table, at which were Colonel Charles Clifton, president of the Automobile Board of Trade and the Pierce-Arrow Motor Company; John N. Willys, president of the Willys-Overland Company; E. P. Chalfant, president of the E. R. Thomas Motor Car Company; H. O. Smith, president of the Premier Motor Manufacturing Company; Charles Y. Knight, inventor of the sleeve-valve motor, and his partner, L. B. Kilbourne; F. B. Stearns, president of the F. B. Stearns Company; H. E. Raymond, of the B. F. Goodrich Company, and a prominent officer of the Motor and Accessory Manufacturers; N. H. Van Sicklen, Sr., president of the Automobile Trade Association; Henry Paulman, treasurer of the

Breakfast to Hudson dealers at the Chicago Athletic Club on February 1

Automobile Trade Association; R. B. Hooper and A. G. Batchelder, respectively president and chairman of the board of directors of the American Automobile Association; C. R. McMillan and David Beecroft, of the Class Journal Company; Walter Wardrop, of *Power Wagon;* W. H. Sexton, corporation counsel, representing the city of Chicago, and Charles E. Gregory, president of the Chicago Motor Club. In addition there were seated at the tables several other prominent tradesmen, including J. I. Handley, president of the American Motors Company; H. J. Edwards, of the newly formed Edwards Motor Car Company; B. C. Spitzley, assistant general manager of the Abbott Motor Company, and others prominent in the accessory field.

Because of the late hour in starting it was impossible to complete the program laid out and the 100 banqueters had to wind up the evening at 1 o'clock, leaving several speakers unheard from. Those who spoke were Colonel Clifton, whose address was on the present and future of the industry; Mr. Beecroft, on distribution, which dealt largely with traffic conditions as they are applied to commercial vehicles; Corporation Counsel Sexton, on motor vehicles in civic service; Mr. Knight, on motoring conditions in Europe; Mr. Raymon, on brains, a most witty speech, and Mr. Wardrop, on commercial vehicles.

Dinner of Cole owners and dealers held at Lexington Hotel during the Chicago Show

Mr. Knight's remarks were based upon European tendencies and he pointed out that in the Old World they are taking up the non-poppet valve motor, worm-driven rear axle, wire wheels, silent-chain driven camshaft and electric lighting plant. After discussing these tendencies, Mr. Knight wound up by remarking:

"Europe designs; America executes. America sends engineers abroad for ideas and information and Europe sends buyers across here for the finished articles after the American has reduced its production to perfection, which he alone appears to be able to reach. After all, it is not a bad arrangement."

Corporation Counsel Sexton took advantage of Mr. Beecroft's report on the commercial vehicle situation in Chicago, which was based on actual facts, to promise that if the motorists would appoint a committee to wait upon him he would put that committee in touch with the proper authorities and endeavor to bring about needed reforms in the business districts which would improve motor vehicle conditions. What impressed Mr. Sexton most was the prediction made by Mr. Beecroft that much time could be saved if the police controlled the pedestrians as well as the vehicles, and he said he saw no reason why the city could not bring about such a reform. Mr. Sexton told how the city had abandoned the municipal motor car service because of the expense, the service having cost the city from $50,000 to $70,000 a year. Now Chicago rents its cars when it needs them, paying at the rate of $2.25 per hour, which has reduced its annual expenses for motor service to $10,000. As an example of the graft which existed under the old conditions, Mr. Sexton told of a city official who had taken the city car to Europe, for which Chicago had to pay.

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Cole Dealers and Owners Dine

CHICAGO, Feb. 3—Dealers and owners of Cole cars were tendered a smoker at the Lexington hotel last night by the Henderson Motor Sales Company, the selling organization for the Cole product. Among the 200 guests there was one dealer from Saskatchewan and another from Australia. After a vaudeville entertainment in which the diners provided their own amusement by doing the most of the singing themselves, toastmaster W. B. Herrick, of the Chicago agency, introduced a number of speakers who told what their departments had done and were planning for Cole owners. Among the speakers were C. P. Henderson, of the sales force, James A. Cole, head of the manufacturing end, A. F. Knoblock, president of the Northway Motor and Manufacturing Company, Gordon of the Timken forces, Wm. Esterlick, of Firestone, E. W. Lewis of the Timken-Detroit Axle Company.

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Indiana Makers Admit Accessory Men

CHICAGO, Feb. 1—Members of the Indiana Auto Manufacturers' Association held an informal dinner at the Auditorium Hotel last night at which action was taken on the application of the accessories manufacturers of the state for admittance to the I. A. M. A. By a unanimous vote it was decided to accept memberships of accessory makers, and at the same time a membership committee was appointed to scrutinize the applications. Expressions of opinion from the representatives of twenty-six Indiana car manufacturers were all favorable to holding the Four-State Tour this year and a committee on tours was appointed to make preliminary arrangements. The offer of the Motor Car Manufacturing Company to furnish a Pathfinder car as pilot car for the tour was accepted.

Dinner tendered to Halladay dealers during the Chicago Show

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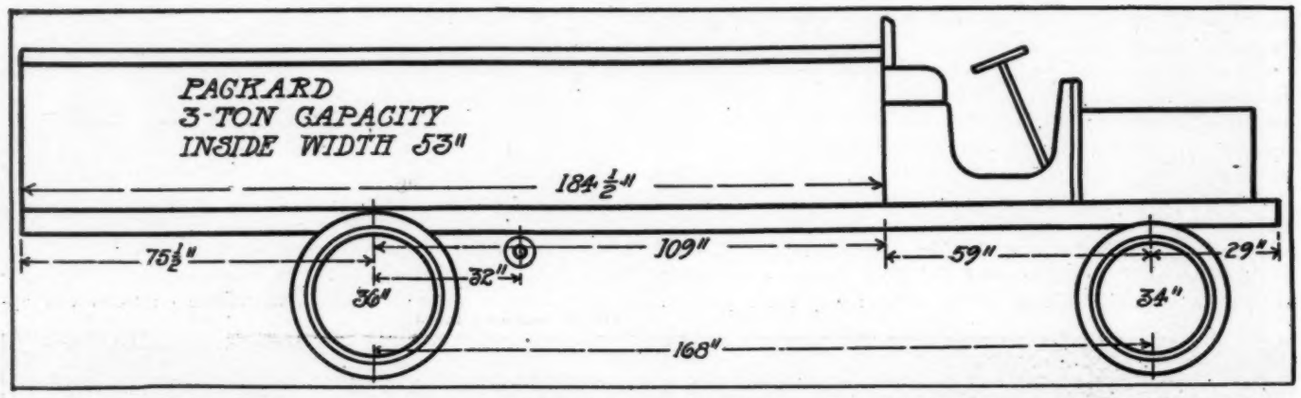
Agents Celebrate Halladay Rescue

CHICAGO, Feb. 1—J. C. Barlow and Paul Chubbuck, who have succeeded in relieving the Streator Motor Car Company of its financial difficulties, celebrated the clean bill of health given them by Judge Landis by entertaining the Halladay agents at a midnight dinner last night at St. Hubert's grill. Sixty-eight attended the feed and listened to the plans for a big season outlined by the company officials.

There was great enthusiasm shown over the outlook and both Mr. Barlow and Mr. Chubbuck assured their representatives that now there no longer existed any legal angles that would have any effect on the company. It has been freed from its court troubles, is well established financially and the prospects are exceedingly bright.

Utilizing the Total Overall Length of the Truck

A Delineation of Some of the Recent Designs



Packard 3-ton truck has great overall length, a large proportion of which is in front of rear axle

Chassis of the Dain Commercial

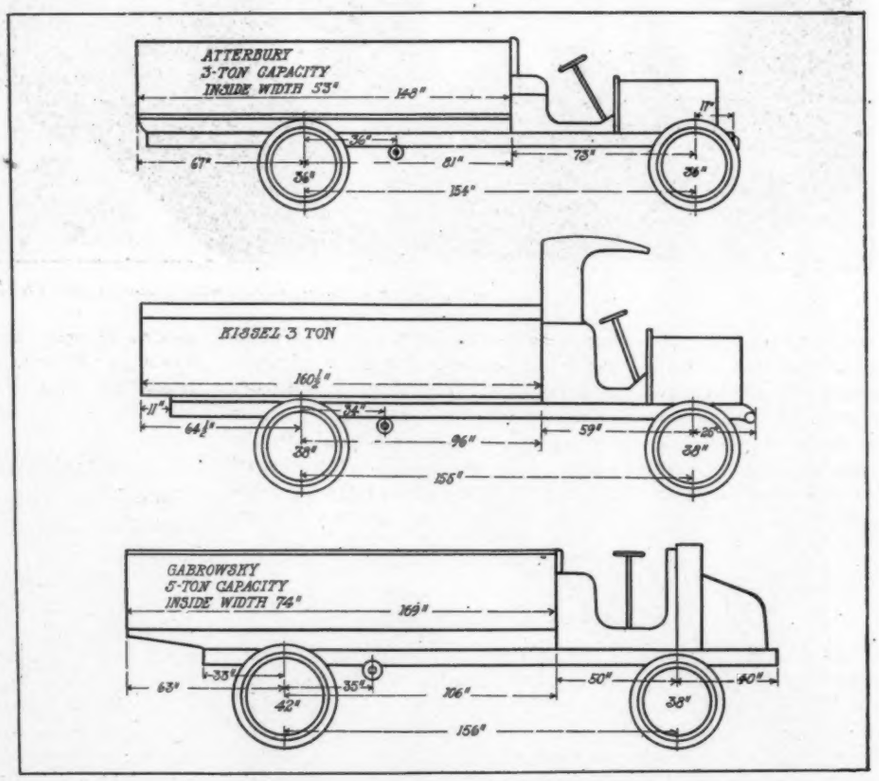
COMMERCIAL car designers have been confronted with the problem of how to make use of the total overall length of a machine to best advantage. Some have placed the driver's cab back of the motor; this necessitates the making of the total length of the machine greater than it would be for the same capacity were the cab placed above the motor. Others have effected a compromise between these two and have placed the steering wheel at the side of the hood, thus saving about half of the space used in the design which has the seat placed entirely in the rear of the power plant.

Each engineer has a number of arguments in favor of his design, all of which have merit. The man who has placed the seats over the motor claims that by this arrangement the load is shifted somewhat forward and the center of gravity is brought nearer to the center of the machine. This makes for more even tire wear all around, better tractive effort for the front wheels and reduction of the total overall length of the truck. The last is an advantage as it gives the truck a shorter turning radius.

The designer who has placed his cab in the rear of the engine comes forward with the claims that in the other constructions too much weight is placed on the front axle, that his motor is more accessible and that it is placed higher in the frame. The front springs can be made somewhat lighter, since they do not have to carry as large a percentage of the load. And being lighter they are less stiff and take up the shocks of the road more readily which tends to reduce motor wear.

These widely varying views of the designers are echoed in the many different lengths of commercial vehicles which they have brought out. For any given carrying capacity it is doubtful if there are any two makes which come very close to each other as to the overall dimensions. Some have made the bodies extremely wide and reduced the length by so doing, while others have made them narrower and have made the length greater to get the same capacity.

Of course, it would be unfair to compare the various designs merely as to capacity and length alone, for the type of body designed to meet a certain class of service has a great deal of bearing on the subject. For example, it would be obviously unfair to say, whereas a certain 4-ton furniture truck has a total



How length is utilized on Atterbury, Kissel and Grabowsky

overall length of 245 inches, and another 4-ton vehicle which is designed for heavy service, such as wholesale meat carrying, has a length of only 168 inches overall, that the former is inferior in design to the latter. One is built for carrying light, bulky articles while the other is made to carry heavy goods, the weight of which mounts up faster in proportion to the bulk than that of the lighter load. Each truck body is a separate design proposition, and the manufacturer in almost every case has treated it as such.

The dimensions given in the accompanying sketches are taken from actual measurements and they show clearly how the total length in each case has been given over to productive and non-productive space.

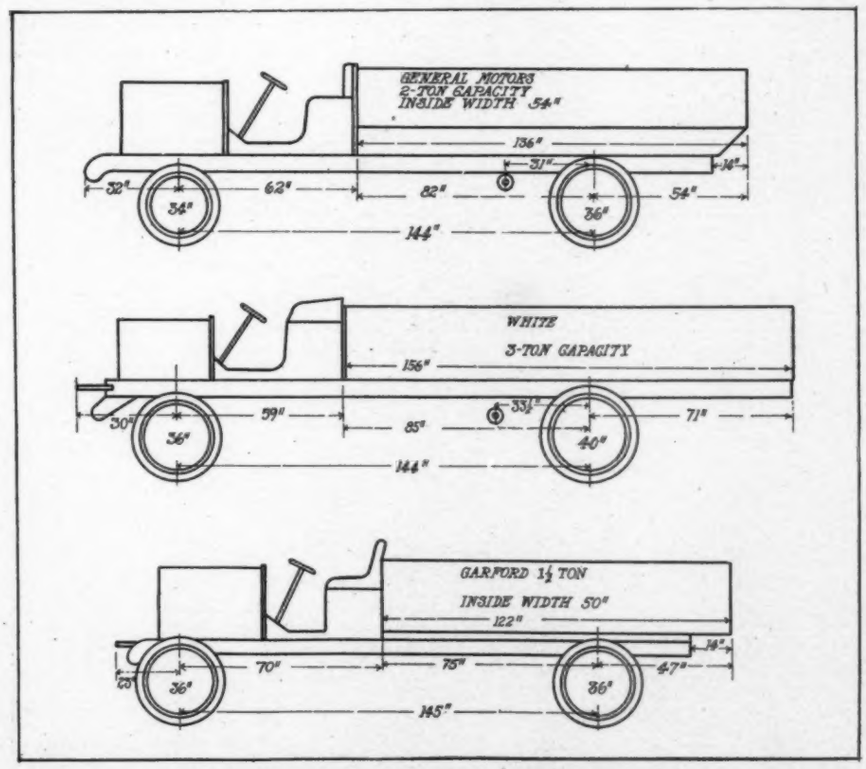
Wheelbase Sometimes Lengthened

Consider first the Packard 3-ton chassis which has the long wheelbase of 168 inches. In this design the seats are placed back of the motor. Thirty-two per cent. of the overall length of 273 inches is devoted to the power plant and cab, while 68 per cent. is available for the body. The rear overhang of the body amounts to 28 per cent. While this machine may seem to be very long, there are a number of other representative designs which have been lengthened an equal or nearly equal amount, as for example, such designs as the Peerless, Stearns, White, Kissel and others. While in the vehicle in question 59 per cent. of the body length is in front of the rear axle, it has been necessary to extend the wheelbase to get this result. It must be borne in mind, however, that the body length afforded in this case is extremely large, it being the greatest of those outlind here.

Now review the group which has a wheelbase in the neighborhood of 155 inches. This consists of the Grabowsky 5-ton, the Atterbury 3-ton and the Kissel 3-ton types. Of these three, the Grabowsky may be considered to have its motor under the seat, while the other two have the cab located behind the engine. The rear overhang in each case is nearly the same, the variation being about 4 inches at the outside. The overall lengths are also nearly uniform, they being 244 1-2 inches Kissel, 259 Grabowsky and 238 Atterbury. The Grabowsky has a width of 74 inches and its productive body length comes to 65 per cent. of the total. The Atterbury, with a width of 53 inches has 62 per cent. devoted to the body, while in the case of the Kissel this value is 66 per cent. This seems to illustrate a point in favor of the 5-ton example with seat over motor, at least in regard to overall length. Although its percentage of productive body space falls between those of the other two, it is capable of carrying 2 tons more than either one of them. Of course, in making such comparison, it must be borne in mind that this machine has been designed for very heavy service, and that its width is very much in excess of those of the other two. Sixty-three per cent. of the body carrying length is placed in front of the rear axle, while for the Kissel this figure is 60 per cent. and for the Atterbury 55 per cent. Grabowsky also carries 15 per cent. of its overall length in front of the front axle, Atterbury 7.2 per cent. and Kissell 10.25 per cent. This shows that the former, in addition to carrying the seats forward, has extended its front overhang more than the other two to get its larger carrying capacity.

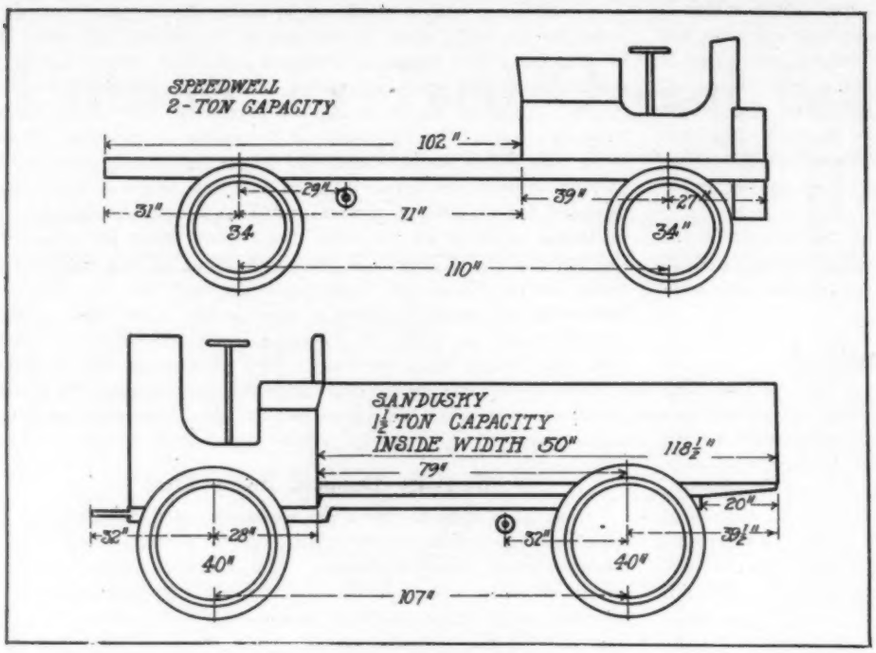
Specially Designed Bodies Used

Let us look next at the three examples cited, which have a wheelbase somewhat shorter than those already considered, namely around 110 to 115 inches. These are a Gramm 2-ton, a Speedwell 2-ton and a Sandusky 1 1-2-ton. In the Gramm 73 per cent. of its total length is useful, in the Speedwell 61 per cent., and in the Sandusky 66 per cent. Each of them has its motor underneath the seat and the front overhang does not vary by more than 1 inch. The Sandusky and Gramm types are designed for general carting service, while the Speedwell has no body attached. As has already been brought out, the body is specially designed for the service to be rendered, and the overall length depends to a large extent on this feature. Whereas a given model may have a certain length when equipped with a stake body, the same model may have a much greater length when equipped with a furniture body. But in the consideration of two of these three machines, the bodies are very nearly for the same service. The Gramm extends 8 inches beyond the rear end of the chassis frame, while the Sandusky overhangs 20 inches; its wheelbase is 107 inches, as against 116 inches for the Gramm. The total rear overhang in the two cases is, however, about the same, the variation being only 1-2 inch. If a body for carting service were added to the Speedwell chassis, it could be made for an equal tonnage with perhaps the same rear overhang. In these three, therefore, making allowance for difference in wheelbase, a marked standardization as regards body construction is evidenced.



Distribution of space in G. M. C., White and Garford

The three machines grouped with a wheelbase averaging 144 inches are types which have the seats located back of the motors. These three show more than the others, perhaps, a striking similarity of body arrangement. The General Motors truck has 68 per cent. of useful space, as based on its total length, the White has 64 per cent. and the Garford 67 per cent. However, the White machine is designed for greater capacity than the other two, and in consequence its useful body space is 156 inches, as against 136 inches for the 2-ton General Motors truck and 122 inches for the 1 1-2-ton Garford. On the White truck the rear overhang is 71 inches, or 29 per cent. of the total. In two of the three cases under consideration the distance from the front axle to the beginning of the productive body space is practically the same, while the White gets its greater tonnage from its increased rear overhang



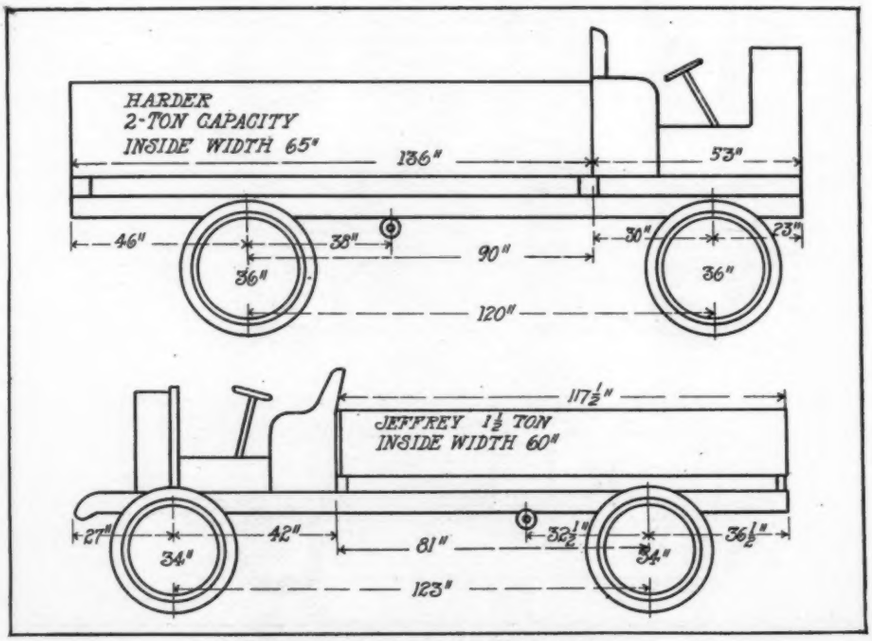
Speedwell and Sandusky distribution of space

compared with the G. M. C. truck. The Garford, which is a lighter affair, takes up more space for its power plant and driver's seat and loses 10 inches which the White gains. Although its wheelbase is the same, its tonnage is less. Of course, this must not be taken as a point against the Garford as some of its wagons carry more with the same wheelbase.

Next to be considered are the Wilcox 1 1-2-ton, the Harder 2-ton, and the Jeffery 1 1-2-ton models. All of these have the drivers' seats placed over their motors and the wheelbases average about 120 inches. The percentage of useful space as compared with the total length is 63 for the Jeffery, 70 for the Wilcox and 72 for the Harder. In comparing the Harder with the other two types the first consideration is that it is designed for the heavier service required by the meat wholesaler, whereas the other two are for intended general delivery service. The Wilcox has a rear overhang of about 34 per cent., while that of the Harder is 24. The latter gains space between the rear axle and the front of the useful body, this dimension being 9 inches more than on the Jeffery and 5 inches more than on the Wilcox. The space given over to the cab is also less than in the other two cases, it being 28 per cent., whereas for the Wilcox it is 30 and the Jeffery 37, although the rear overhang is not brought beyond the end of the chassis frame.

The Stegeman 4-ton and the Mack 7-ton models which are of 150-inch wheelbase also offer an interesting comparison for the student of commercial car construction and design. Each has its seat back of the motor and the front overhang does not vary by any considerable amount. The Mack is designed for heavy, bulky haulage, while the Stegeman is of the bulky delivery type. Whereas Mack uses a 127-inch body for 7 tons, the Stegeman has a 142-inch body for 4 tons. The width of the Stegeman body is 88 inches as against 56 1-2 for the Mack. Further evidence of design for bulk in the Stegeman rather than weight is brought out in the comparison of the lengths of rear overhang, that of the Stegeman being 60 inches, while on the Mack it is 46 inches. The overall lengths vary 10 inches in favor of the Stegeman, and its productive body space is 61 per cent., as compared with 67 per cent. for the Mack. No appreciable difference in length from rear axle to end of productive space forward is to be seen. The widely varying tonnage capacity in these two cases is due solely to the type of service to which the trucks are put.

A number of other interesting comparisons of overall length utilization might be brought out, but from the examples at hand, it is easily seen that in point of total overall length the construction which embodies the placing of the seats or cab over the power plant has the advantage of requiring less length than a type of the same load capacity, having the motor in front to an amount equal to the hood length. As this hood length is a matter of some 40 to 50 inches, it appears to be a point worth considering. Are the advantages to be gained from placing the seats over the engine great enough to outweigh those claimed for the other seat position and to make this construction the preferred one or *vice-versa*? This question is certainly a live one with truck designers at the present time. Perhaps the year will bring out many changes, and at the next year's shows the number designing in one way or another will settle the matter.



Medium overhang on Harder and Jeffery

A.C.A. Meeting to Protest By-Laws

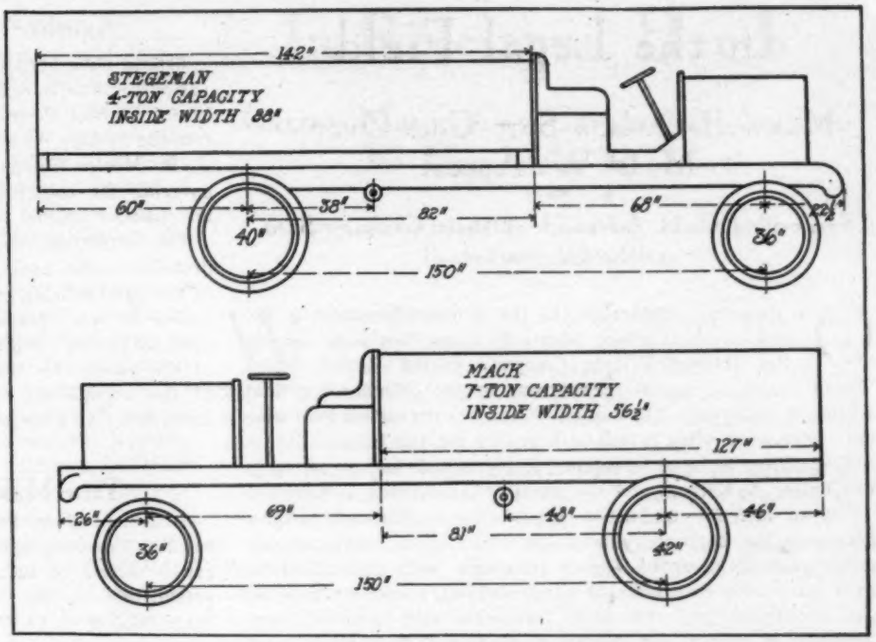
Henry Sanderson, president of the Automobile Club of America, has been formally called upon to issue a special notice for a meeting of the club prior to the regular meeting scheduled for February 19, to protest against the passage of the new code of by-laws. The protestants declare that the club is endeavoring to set up an oligarchy, the governors controlling the officers.

Capital Wheel Tax Upheld

WASHINGTON, D. C., Feb. 2—The District of Columbia Court of Appeals having upheld the constitutionality of the so-called wheel tax law, plans for the strict enforcement of the statute are being made by W. P. Richards, the district assessor. Notices that the tax is due will be sent to every owner of a motor car in the District of Columbia and failure to pay it will result in a summons to the police court. The penalty for non-payment of the tax, under the law relating to the collection of licenses, approved July 1, 1902, is a fine of not more than $500 or 30 days' imprisonment.

This tax was authorized in the district appropriation bill of March 3, 1909, which provided "that hereafter there shall be assessed and collected an annual wheel tax on all automobiles owned and operated in the District of Columbia having seats for two persons the sum of $3, and on all such vehicles having seats for more than two persons an additional tax of $2 for each additional seat." No penalty was provided for non-payment, and on account of the difficulty in enforcing the law an amendment to the act was included in the District appropriation bill of March 18, 1910, providing for fine or imprisonment. The constitutionality of the law was tested in the police court by Leroy Mark, manager of the southeastern division of the Touring Club of America, resulting in a verdict in favor of the District, which was approved by the Court of Appeals.

The following policy has been adopted by Assessor Richards for the collection of the tax: The rate of assessment will be based upon the number of seats, a seat accommodating two persons to be $3, and each additional seat, whether it holds one, two or three persons, to be $2 each. Owners and operators coming to the city for a temporary stay will not be taxed. Those residing in adjoining states, who come to Washington daily on business, are liable to the tax.



Stegeman and Mack have long wheelbases

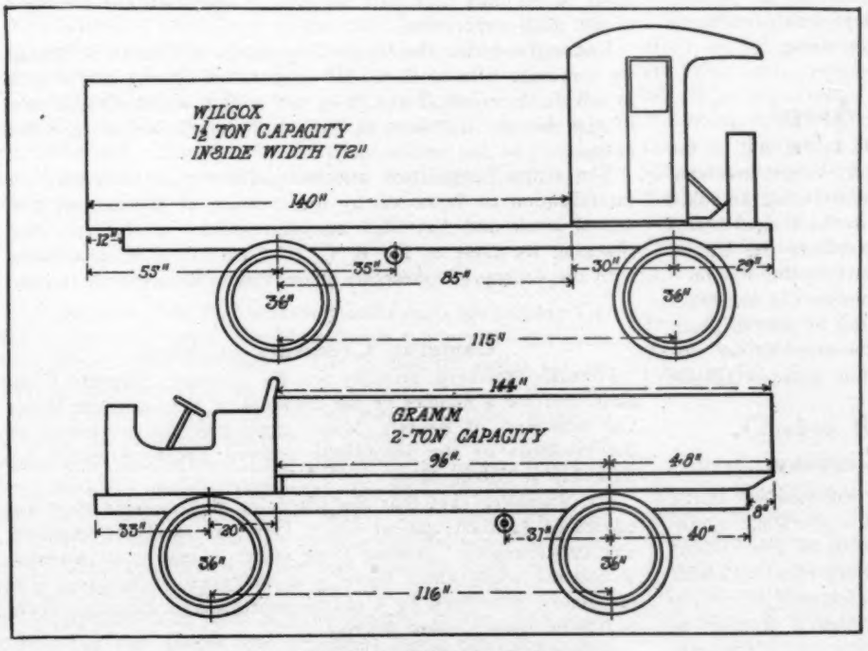
Few Spuds in Maine; Can't Help Trade

PORTLAND, ME., Feb. 4—Some one is talking about the state of Maine who is not familiar with his subject. He is declaring that the coming year will be a big one for automobiles in the Pine Tree State because of the big potato crop. This person has also said that the potato crop governs the automobile business in the State of Maine.

It may be so. In the northeastern section of the state the potato crop does exert its influence, but there it practically ends. There are other industries for other parts of the state that affect the automobile business just as much.

It may be a good year for automobiles in Maine, but Aroostook County, the section that raises the greatest part of the potatoes, is the poorest part of Maine for the auto business.

The fall of 1911 saw a potato crop harvested in Maine that was well under the average, instead of being large. The big frost of September 13 killed hundreds of plants and rains wet more. As a result, the supply fell below normal. Potatoes are now scarce and are bringing such fancy figures on the market that the wholesale dealers of Portland and the state in general have found it cheaper to import the "spuds" from Great Britain.



Wilcox and Gramm designs

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Maine's Tax Causes Trouble

PORTLAND, ME., Jan. 31—For one month the new Maine automobile law has been working. And it has now run into a snag. Singularly enough, the Ford car which caused so much trouble to the Selden people is causing the difficulty with the Maine law.

Ford cars are listed to be 20 horsepower. Under the Maine law, which is now in effect, cars of this size shall pay a tax of $5, but if they are between 20 and 25 horsepower the tax shall be $10. The A. L. A. M. test is to be applied to the motors.

In the Legal Field

Maxwell-Carlson Suit Goes Over—M. & W. Appeal

Spark-Plug Cases Advanced—Elkhart Company Sued by Creditors

OF exceeding importance to the automobile world is the suit of the Carlson Motor & Truck Company against the Maxwell-Briscoe Company in the United States Circuit Court of Appeals, which was on the calendar for final argument yesterday. On motion of counsel the matter went over until next week when it will be heard by the full bench.

The matter at issue is patent 797,555 issued August 22, 1905, to Charles A. Carlson and the claim at issue reads as follows:

"In an internal combustion engine, the combination with a hollow casing, opposed cylinders secured thereto, and inlet and exhaust valves mounted in part stationary with said cylinders, of a removable coverplate and cam followers also mounted in said coverplate, and removable therewith, said cam followers arranged to engage and operate said valves."

The defendant company is alleged to use such a combination in its two-cylinder model and suit was commenced in equity in April, 1907. United States District Judge Hazel heard the case in April, 1910, and decided in favor of Carlson. A rehearing was granted and later the case was reopened and additional testimony was submitted. The court again held in favor of Carlson and it was from this decree that appeal was taken by the Maxwell-Briscoe Motor Company.

The main claims made for the Carlson device are that it allows easy access to the crankcase and cylinders, at the same time containing the mountings of the camshaft and valve-actuating mechanisms.

The defense contests the idea of infringement and claims that the Carlson device was anticipated by prior art both in this country and abroad.

It relies among other things upon the Walrath engine and a French patent which is said to cover the same ground.

Should the patent be upheld finally by the United States Circuit Court of Appeals, the complainant proposes to proceed against a dozen or more concerns using similar ideas, particularly in automobile truck construction and in motor boats.

M. & W. Take Formal Appeal

Formal entry of an appeal has been made in the suit of the Republic Rubber Company against Morgan & Wright involving the alleged infringement of the Mell patent covering anti-skid treads. The order was entered last Friday in the United States Court and the matter is likely to come up before the United States Circuit Court of Appeals the latter part of this month.

Under the conditions that obtained previous to the order the status of the manufacturing companies will not be altered pending a further ruling of the court. This status provides for suspending, under bond, the temporary injunction granted against the defendants.

Creditor Sues Elkhart Company

ELKHART, IND., Feb. 6—Claude E. Jackson has filed suit in the Superior Court at Goshen, Ind., to foreclose a mortgage aggregating $63,700 on the real estate formerly owned by The Elkhart Motor Car Company, of this city, and later transferred to Elmer Automobile Corporation. Jackson asks that judgment for $3,000 be given him as one of the creditors and that a receiver be appointed for the property. The Elmer Automobile Corporation is the one that was promoted by H. H. Elmer.

Another Step in Spark-Plug Cases

Proofs have been closed in the big spark-plug cases and the various actions have been entered on the calendar of the United States District Court for March. The suits, as exclusively recounted in THE AUTOMOBILE several weeks ago, were entered by A. R. Mosler Company, which owns the Canfield basic patent covering the construction of spark-plugs that provides for an air chamber around the electrode.

The defendant, the Auto Supply Company, and its former president, John Lurie, are only nominal defendants. The brunt of the fight is being borne by the manufacturers of five different makes of spark-plugs which are alleged infringements on the Canfield patent. William A. Redding is handling the prosecution of the matter for the Mosler company. The actual defenders of the arction are the Mezger, Rogers, Rajah, Belgian and American Coil Companies.

Tire Makers Take Grant Licenses

Settlement of the litigation instituted by the Consolidated Rubber Tire Company against the Hartford Rubber Works and Morgan & Wright on account of alleged infringements of the Grant patent, held by the Consolidated, has been made in the United States Court.

Under a series of orders entered last week, the defendant companies acknowledge the validity of the patent in question and take out licenses to manufacture tires under its terms.

The Grant patent covers the use of two circumferential wires embedded in the substance of the tire itself. It has only about one year to run. This type of tire has been made by the Kelly-Springfield interests for a number of years.

Hupp Corporation to Change Name

Circuit Judge Alfred J. Murphy of Wayne County, Michigan, has signed a consent decree in the litigation commenced by the Hupp Motor Car Company against the Hupp Corporation and R. C. and Louis G. Hupp by the terms of which the defendants are prohibited from using the name Hup (p) to designate any gasoline automobile that they may produce in advertising it for sale. The individual defendants are allowed to use the name Hupp as officers of the new corporation, but the decree specifically provides that the type in which the names are set must be no more than half the size of that used for the name of the said corporation.

Under the decree the Hupp Corporation is ordered to change its corporate title to R. C. H. Corporation or any other name in which the word Hup (p) is not a part within fifteen days of the date of the decree. No costs were awarded to either party.

The Hupp Corporation announces that it has increased its capitalization to $1,000,000 by the creation of $200,000 of preferred stock and has filed amended articles of incorporation changing its name to the R. C. H. Corporation in accordance with the decree. The factory plant will be enlarged materially.

Cameron Creditors to Meet

Herman Steinberg, attorney for the Eismann Magneto Company, and for a number of the creditors of the Cameron Motor Car Company, of Beverly, Mass., announces that a meeting of the creditors of the automobile concern has been called for Saturday at Salem, Mass.

Mr. Steinberg says that the schedules filed indicate total liabilities of $200,000, against which there are assets of unknown size and character. Among these assets is real estate assessed at $62,000, upon which there is a mortgage of $31,000. The machinery is covered by a chattel mortgage of $10,000. There is due on open account $17,000.

A lively tilt is expected at the meeting, as many of the claims are held by attorneys favorable to the company.

Tire Store Raid Told in Court

Probably the most spectacular raid in the history of the automobile industry was recounted before United States District Judge Holt last week when the case of the Diamond Rubber Company and others against Harold R. Hare, the Braunwarth-Weiss Company and others was heard and judgment rendered against the defendants for an indeterminate sum in excess of $8,000. Bilder & Bilder, attorneys of Newark, N. J., handled the matter for the plaintiffs, and according to their statements the facts are as follows:

Harold L. Hare and Charles F. Seifert were in business as a partnership, conducting a rubber store and accessory station in Newark in March, 1911. They dissolved partnership early in April, Hare electing to continue the business at 6 Branford street and assuming the outstanding liabilities of the concern.

On the evening of April 7 the store was stripped clean and the following morning the New York Diamond agency, the Republic Rubber Company branch and several other concerns, including the United States Tire Company, all of whom were creditors of Hare, retained the Newark law firm to investigate.

According to the lawyers, a careful search showed that three vans and an automobile truck backed up to the Hare establishment on the night of April 7 and were loaded with all the stock contained in the store. The wagons proceeded to New York.

The drivers were negroes and one or two of them testified that they had been paid $20 to know as little as possible about the whole transaction, including the disposition of the goods.

The law firm immediately filed a petition in involuntary bankruptcy for Hare, and as soon as the receiver had been appointed in New Jersey they filed a petition for an ancillary receiver in New York and applied for an injunction against Braunwarth-Weiss. The petition set forth that the plaintiffs were able to identify goods to the amount of $8,000. The defendants asserted that the transaction was valid and that the company was an innocent purchaser for value. The court required the defendants to put up a bond for $8,000 and the case was placed on the calendar for hearing.

After going into the testimony Judge Holt decided in favor of the creditors and authorized a judgment for the full amount covered by the bond.

Bilder & Bilder then moved for an increase of the judgment to $13,000, claiming that Hare's private automobile and much other matter not specifically identified should be included in the amount of the judgment.

With regard to this phase of the case, Judge Holt held that the judgment might be increased upon it being shown that the items claimed appear in the record.

The defendants state that they paid out $4,000 or more for the stock and that the transaction was honest as far as they were concerned. They announce that the matter will be properly appealed and that it will be taken to the Supreme Court if necessary.

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Races Attraction at Mardi Gras

NEW ORLEANS, Feb. 3—Automobile enthusiasts are looking forward to two events of unusual importance this month—the races during Mardi Gras, February 17 and 18, and the motor car exhibitions, February 21 to 25.

Seven events for each day of the meet have been arranged and stock cars from practically every agency in the city have been entered and there is much local interest in the races. Improvements are being made on the track. The banks on the turns are being made longer and higher, which will permit of much greater speed than was the case at the races last year. A second fence is being constructed 30 feet back from the track fence as a safeguard against possible accidents. As an additional precaution no spectators or cars will be allowed in the open space between the two fences, the promoters being determined that that there shall be no repetition of last year's Syracuse horror.

In Receivers' Hands

Carter Motor Car Corporation Said to Be Hopelessly Insolvent

Makers of Washington Car May Have to Face Bankruptcy Proceedings

WASHINGTON, D. C., Feb. 6—Wilton J. Lambert and A. Gary Carter have been appointed receivers of the Carter Motor Car Corporation, makers of the Washington car, following the filing of a petition to foreclose under a deed of trust by E. A. Bowers, trustee, and George E. Davenport, holder of promissory notes aggregating $50,000.

It is alleged the securities are in danger; that the corporation is hopelessly insolvent and that under the terms of the deed of trust foreclosure is deemed urgent.

On the showing the court named the receivers, fixing their bond at $20,000. Mr. Carter is president of the corporation, which has its factory at Hyattsville, Maryland.

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The manufacturing project started about 3 years ago, some of the first cars turned out being entered in the Munsey Tour of 1909. The following year the cars were marketed in a small way and in August, 1910, on the occasion of the Munsey Tour of that year, the Washington trio made a satisfactory showing.

Following the fall of 1910 the business was enlarged from a selling viewpoint, but never attained large proportions.

The Carter Motor Car Corporation never was affiliated with any of the automobile organizations of national scope. The line was exhibited at the independent show at the Palace in 1911.

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February Opens Racing Season

Sporting matters are looking up. The Contest Board of the A. A. A. has sanctioned the annual road race at Bakersfield, Cal., which will be held February 22. Track races at New Orleans in connection with the Mardi Gras celebration, February 17-18, have also received the official O. K.

The only other new date for which final sanction has been granted is for the Galveston beach meet, August 8, 9 and 10.

The three dates of the Chicago Motor Club have been definitely settled and sanction for each has been issued. These are May 15-17, commercial vehicle test; June 20, Algonquin hill climb, and October 7-11, reliability run.

Nothing definite as to the Fairmount Park race has developed recently. The exact date and character of the Elgin races for 1912 have not been fixed. If the race is again to be the premier stock car event of the year as it has been in the past, the Chicago Motor Club may take charge, according to announcement from the Contest Board. If it is to be a non-stock event, there is some doubt as to the management by the club.

A movement is on foot to run the Vanderbilt Cup race from Port Jefferson, L. I., and a proposal to that effect has been made to the Contest Board, but no definite action has been taken so far.

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Quaker Banquet Booms Highways

PHILADELPHIA, Feb. 3—Upward of 200 members and guests attended the National and State Highways Assembly and fourth annual banquet of the Quaker City Motor Club, held at the Hotel Walton on Tuesday evening, and the function was unanimously voted the most interesting and successful ever held by the organization. The banquet room was attractively decorated with plants, flowers and the national colors.

The hit of the evening was the address of President Paul Huyette, who outlined the club's history for the year.

Harrisburg Show a Success

Arena Too Small to Accommodate All Applicants for Space

Central Pennsylvania Flocking to the Capital to Inspect the Exhibits

HARRISBURG, PA., Feb. 3—The third annual exhibition of the Harrisburg Automobile Dealers' Association opened this afternoon at 2 o'clock at the Arena, Third and Delaware streets, and promises to surpass any show ever held by the association. Over fifty models of twenty-two different makes of automobiles are shown. J. Clyde Myton is the manager of the show.

Although the Arena offers more floor space than was ever before available, it was not ample enough for the great demand that was made by the motor car dealers and manufacturers and accessory men. The interior of the building is beautifully decorated and many electric lights light the booths at night. Hundreds of visitors from central Pennsylvania and many prominent automobile men have been in attendance during the show.

The following is a list of automobile and accessory exhibits:

Pleasure Cars—American, American Automobile Company, Philadelphia; Abbott-Detroit, Reo, National, Harrisburg Auto Company; Buick, E. M. Hottenstein, Lebanon; Cadillac, Crispen Motor Car Company; Case, J. I. Case Threshing Machine Company; Chalmers, Pullman, E-M-F, Flanders, Keystone Motor Car Company; Columbia, Maxwell, Andrew Redmond; Hupmobile, Velie, Overland and Oldsmobile, East End Auto Company; Hudson, Inter-State, R. C. H., I. W. Dill; KlineKar, Kline-Kar Motor Corporation, York; White, the White Company of Philadelphia, L. F. Ganster, Reading.

Commercial Cars—Reo and Mack, Harrisburg Auto Company; Buick, E. M. Hottenstein; Flanders, Cass, Keystone Motor Car Company; Morton Truck, Morton Motor Car Company; Maxwell, Andrew Redmond.

Accessories—Monitor Manufacturing Company, Landisville, Pa., oil pumps, tanks and measures; Wayne Oil, Tank & Pump Company, Fort Wayne, Ind.; Atlantic Refining Company, oils and grease; Haines Measuring Pump Sales Company, Harrisburg, pumps; Keystone Lubricating Company, Philadelphia, oils and grease; Sterling Auto Tire Company, Harrisburg, tires and tire repairs; William E. Essick, insurance; Meyers Brothers, New York, ivory automobile novelties; Puritan Soap & Polish Company, Buffalo, N. Y.; Indian Refining Company, New York, Havoline oil.

London (Ont.) Shows American Cars

LONDON, ONT., Feb. 7—About one hundred various makes of motor cars are on exhibition at the first annual automobile show, which opened here this evening at 8 o'clock, under the auspices of the London Automobile Dealers' Association. The Armories are beautifully decorated with Canadian banners and ornamental columns of uniform design to which are attached shields bearing the names of the cars shown.

The following makes of cars are on exhibition at the London show: Colby, Hudson, Overland, Ford, Reo, Franklin, Hupmobile, R-C-H, Nyberg, Maxwell, Chalmers, Stoddard-Dayton, White, Galt, Everitt, Paige-Detroit, E-M-F, Flanders, Oakland, Oldsmobile, Cadillac, White trucks, McIntyre trucks, Ford delivery, Clinton trucks, Brantford trucks, Petrolia trucks, Canadian Commercial cars, Hupp-Yeats electrics. Oil companies, tire manufacturers and makers and dealers in different lines of accessories also are being exhibited, and Manager George Fraser predicts that the initial exhibition for London will prove successful. The show will run four days, closing Saturday night.

Pittsburgh Show Success Despite Cold

PITTSBURGH, Feb. 5—The second week of the Duquesne Garden Show put on by the Pittsburgh Automobile Dealers' Association will be devoted principally to the exhibits of motor trucks. The attendance during the first week—the pleasure vehicle show—was quite satisfactory considering the extreme cold weather. Dealers announce that medium-price cars will have a big call in the local market this year.

The growth of the commercial vehicle business in Pittsburgh is shown by the increasing interest among mercantile firms who visit the Duquesne Garden show year after year. Three years ago the first motor truck was exhibited. This week there is a fine collection of vehicles varying in size from a light delivery wagon to a mammoth brewery truck and including police and fire trucks. The electric delivery wagons are commanding especial attention as they are driven by single motors and equipped with heavy or light duty batteries to give them mileage capacity of from 40 miles to 75 miles on a single charge. The show will close Saturday night, February 10.

The trucks which were on exhibit the second week of the Duquesne Garden Show are as follows: Ford, Packard, Peerless, White, Buick, Sampson, Pierce-Arrow, Little Giant and Reo.

News of the Local Shows

Baltimore, Atlanta, Indianapolis, Syracuse, Davenport—Washington Drops Out

BALTIMORE, MD., Feb. 5—Space has been allotted for the commercial cars exhibiting at the local show during the last three days, February 26 to 28, inclusive. There will be about sixty different models of commercial cars.

ATLANTA, GA., Feb. 2—The decorators and the show committee of the Atlanta Automobile and Accessory Dealers' Association have been in charge of Atlanta's Auditorium-Armory for several days now and already much progress has been made in putting the building in trim to receive the exhibits. Twenty-four different branches and agencies will exhibit forty-five makes of car and will show probably 120 machines.

INDIANAPOLIS, IND., Feb. 3—Indications are that the space for the motor car show to be held in Indianapolis March 25 to 30 will all be taken within a short time. Charles A. Bookwalter, president of the Hoosier Motor Club, has appointed the following committee to assist the trade association in making the show a success: Joseph W. Selvage, chairman; Hiram Brown, Bert A. Boyd, Charles Sedwick, W. L. Easterly, the president and W. S. Gilbreath, secretary.

SYRACUSE, N. Y., Jan. 27—The Syracuse Automobile Show committee was puzzling over a matter of ninety-five demands for space at the Armory, where the exhibition will be held in March, which will accommodate only fifty-two exhibitors. Rather than ask exhibitors to reduce their spaces, it was decided that an annex show will be held at the Alhambra, another large building here, and both cars and accessories will be shown there.

DAVENPORT, IA., Feb. 3—Owing to the large number of applications from dealers for floor space at the annual show of the Davenport Automobile Club it has been decided to limit the displays to pleasure cars. The show will be held in the Davenport Coliseum February 28-29 and March 1-2. This will be the last year the show is under the management of the Davenport Auto Club, as the Tri-City Auto Dealers' Association, recently organized, will stage the show in the future. F. W. Skinner is in charge of the event.

WASHINGTON, D. C., Feb. 2—At a meeting of the show committee held yesterday it was decided not to hold a motor car show in Washington this year, but Chairman W. C. Long was authorized to lease Convention Hall for the first week in February, 1913, for a show.

Big Attendance at Bangor Show

BANGOR, ME., Feb. 5—The annual motor car show held by the Bangor, Me., dealers opened here this morning, and there was a big attendance throughout the day and evening. The show will run a full week and it is being held in the Bangor Motor Company's garage on Main street. There are thirty makes of cars being shown and with the accessory exhibits it makes a splendid line. The show far surpasses the first one held here two years ago, both in size and exhibitors. The downtown streets have been strung with electric lights and they make a brilliant display at night. They are white lights with clusters of red, and in front of the show building is a big sign gleaming out so it can be seen for blocks reading "Auto Show Now Open." The building has been decorated inside with bunting and light colored fabrics of green and gold, and a large amount of lattice work covered with Japanese peach blossoms makes a beautiful effect. The makes of cars being shown comprise a Pierce-Arrow, Winton, Ford, Elmore, Overland, Oldsmobile, Maxwell, Stoddard-Dayton, Oakland, Haynes, Buick, Velie, Lozier, Stearns, Stutz, E-M-F, Flanders, Knox, Cole, Cadillac, Sampson, Hudson, Thomas, Franklin, Chalmers, Jackson, Cutting, Metz, Brush and Palmer-Singer.

Many Small Shows Booked

Columbus, Oshkosh, Omaha, New Orleans and Toronto Making Great Preparations

COLUMBUS, O., Feb. 3—Arrangements are progressing satisfactorily for the second Columbus show, to be held under the auspices of the Columbus Automobile Club and the local dealers beginning March 2 and continuing for a week. Space has been apportioned among the twenty-seven dealers of Columbus and central Ohio, and the indications are that the show will be a huge success. The committee of arrangements is composed of Perin B. Monypeny, chairman; C. E. Firestone, secretary; Herman Hester, treasurer; J. C. Kimmel and I. P. Madden.

OSHKOSH, WIS., Feb. 3—The Oshkosh Automobile Dealers' Association, recently organized, will hold its first show, and the first motor exposition in Oshkosh, from February 27 to 29, inclusive. The show will be held in the Company B Armory, on Merritt street and will be conducted along the lines of the Milwaukee and Minneapolis shows. Sixty-two distinct makes of cars are represented in Oshkosh, a city of 36,000 population, and all dealers are members of the association. Motorcycles will have a special division. The show will be in charge of President J. A. Crum, Vice-president F. S. Hoaglin, Secretary Arthur Thom and Treasurer W. F. Scoular.

OMAHA, NEB., Feb. 5—The J. I. Case Company's Omaha branch has been granted permission to exhibit cars at the Omaha Automobile Show, Feb. 19-24. This brings the total number of exhibitors to 47. All of the space was allotted some time ago, and it has taken considerable manipulating to provide space for all of those who wanted to exhibit cars or accessories.

NEW ORLEANS, LA., Feb. 3—Several thousand dollars will be spent in decorating the Washington Artillery Hall for the show. Every agent has agreed to take part in the exhibition. The Dealers' Association, under whose auspices the show will be held, is represented by Joseph Schwartz, Ginder Abbott, W. P. Johnson and Thomas C. Campbell.

TORONTO, CAN., Feb. 5—"Kings sometimes unbend," and the Right Honorable Sir John Gibson, Lieutenant-Governor of Ontario, has graciously consented to open the forthcoming automobile show to be held in the Armories here the week of February 21-28. The premier of the province and the members of the Ontario Legislature have also been invited. The show is conducted by the Ontario Motor League.

100 Cars Shown at Scranton

Forty-Nine Different Factories Represented in the Exhibit

Including a Score of Commercials—Outlook for Latter Is Excellent

SCRANTON, PA., Feb. 3—Never in the history of Lackawanna County has there been such a wonderful and large exhibition of automobiles as was shown at the Thirteenth Regiment Armory, in Scranton, starting January 29 and closing on February 6. Just 100 cars were uncovered to the public's view when the opening was held on Monday night. Forty-nine different factories were represented in the exhibit and almost every conceivable style of car was to be seen.

It is doubtful if there is a city of its size in the country where the automobile has enjoyed a better growth than it has in Scranton and Lackawanna County generally. The agents at the show were all confident that the end has not yet come and they expect that in the year 1912 there will be close to 500 cars sold in the county.

A number of sales were started at the show, but none of them were closed, and for that reason no names of purchasers will be given at this time. Every agent is confident of selling one or two cars, and if this is accomplished it will be an improvement over the first exhibit held here a year ago.

The interest being taken by business men who have use for delivery vehicles is one of the main causes of the large growth of the automobile industry here. Two motor trucks were shown at the first show held in this city and only about ten commercial motor vehicles were in use here. About twenty cars, some small delivery wagons, other hotel buses, drays and one fire truck, were exhibited at this show. It is safe to say that there are about fifty vehicles at work in the delivery of goods in Scranton now and the number is increasing so rapidly that it will not be long before there will be seventy-five or, perhaps, even 100 in the service of local firms.

An idea of the size of the show can be gained from the fact that it took up just 40,000 square feet of floor-space. A large number of accessories were shown, as were a number of patent devices. Principal among the new devices was a compressed-air self-starter which has been patented by the Chalmers company. It is operated by a button on the inside of the dash of the car.

There was one deal closed with the C. B. Scott Company for the handling of a new car. The car is the Oakland, which is new in Scranton. The Challenger Brothers, of Wilkes-Barre, have the agency for it and exhibited the car in the local show.

Newark Show to Be Jersey's Greatest

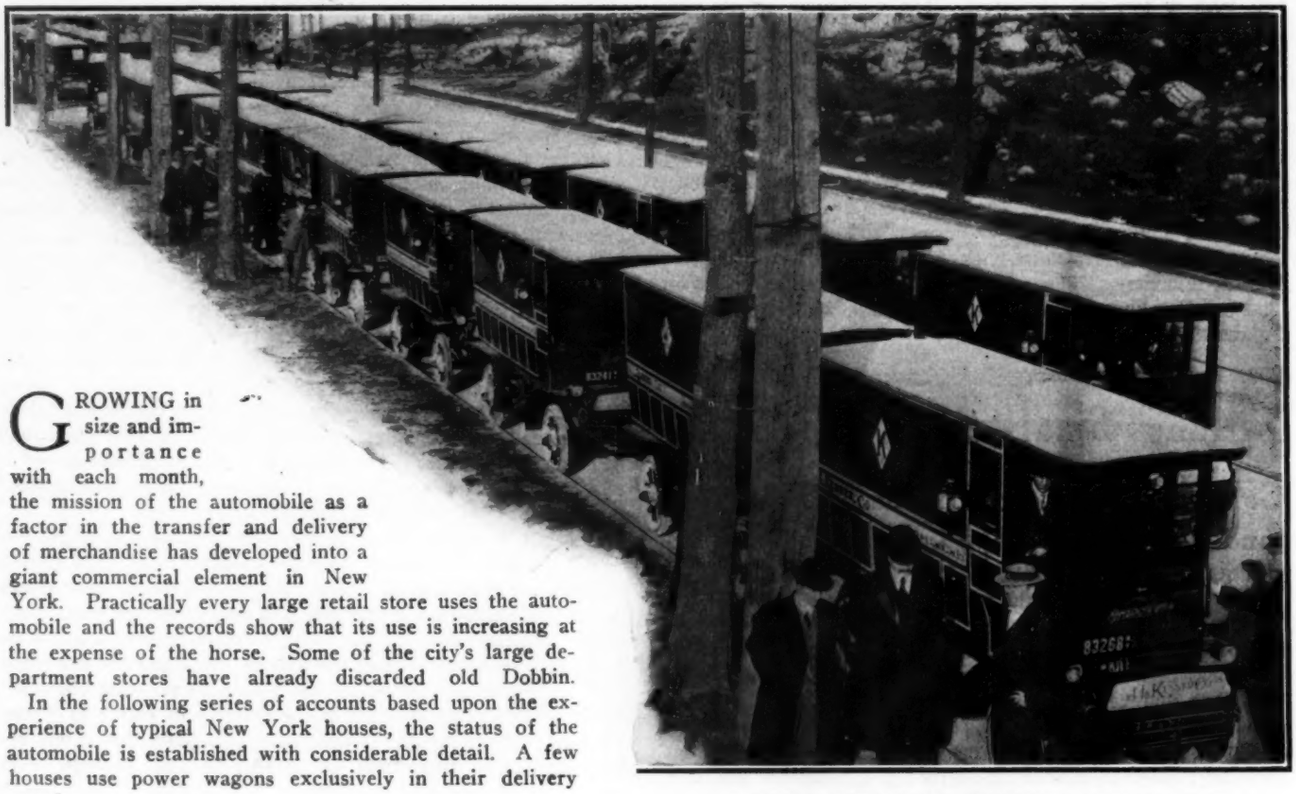
NEWARK, N. J., Feb. 5—With a display of the product of sixty-five of the leading automobile manufacturers, the fifth annual Newark Automobile Show, to be held in the First Regiment Armory, February 17 to 24, will attract visitors from all parts of the New Jersey field. The exhibit will cover both pleasure and commercial cars, and will be the first in this respect to be held in the metropolitan district this year.

The Newark show is under the direction of the New Jersey Automobile Exhibition Company, with the co-operation of the New Jersey Automobile Trade Association and the First Regiment, N. G., N. J. During the show week there will be several important coincident events, including a state goods roads convention.

The list of car exhibits will include sixty-nine pleasure and commercial vehicles represented by one or more models, in addition to which there will be nearly two-score exhibits of accessories of various kinds.

Motor Delivery in Gotham's Big Stores

Analyzing Service Systems in Various Establishments



A portion of the Grabowsky battery of Kesner & Co.

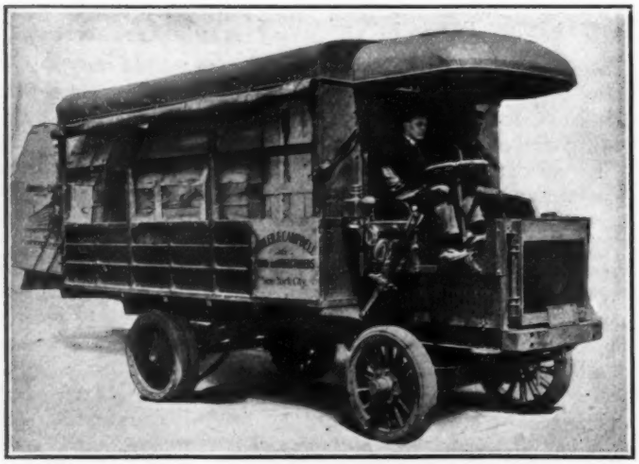
GROWING in size and importance with each month, the mission of the automobile as a factor in the transfer and delivery of merchandise has developed into a giant commercial element in New York. Practically every large retail store uses the automobile and the records show that its use is increasing at the expense of the horse. Some of the city's large department stores have already discarded old Dobbin.

In the following series of accounts based upon the experience of typical New York houses, the status of the automobile is established with considerable detail. A few houses use power wagons exclusively in their delivery service.

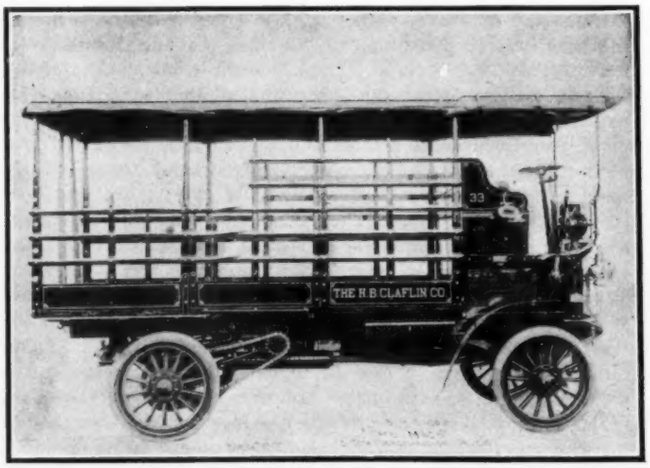
Transfer and delivery work in New York City is frequently accomplished with mixed equipment. Some concerns use horse-drawn vehicles exclusively; some use horses and electrics; some, horses and gasoline wagons; some, all three and a few use gasoline and electric automobiles in combination. In the latter class of houses is the big carpet company, W. & J. Sloane, which has entirely replaced its horse-drawn equipment with power wagons.

This concern was among the pioneers in the use of the business automobile, as it installed several General Vehicle trucks as far back as 1902 and has used more or less of this variety of transportation ever since. Of course, the old veterans that were put in service have been disposed of and replaced by other cars of more recent model, but in the Sloane equipment there are four 3 1-2-ton General Vehicles at present.

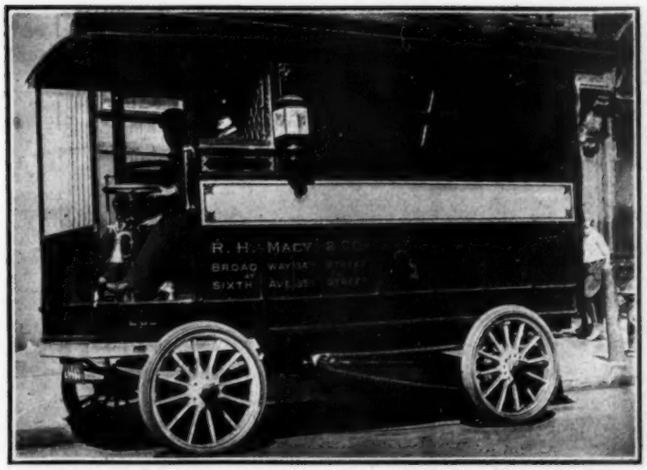
The history of the gasoline car equipment commenced in 1905 when two Atlas trucks of 3 tons capacity were installed to supplement the service of the General Vehicles and horses. In 1909 a single 3-ton Packard was purchased. Until 1911 these were used together with a decreasing number of horses.



Type of Alco truck much used by department stores



Three-ton Mack truck in service of H. B. Claflin Company



One of the Lansden contingent in the Macy equipment

Open-body Autocar used for special delivery by Wanamaker

But with the season of 1911 there came a great change in the situation. The showing of the automobiles had proved satisfactory and vastly better than horse service in every way. Some of the trucks were no longer new and it was deemed necessary to replace the whole delivery equipment.

This was done by installing a series of White trucks of varied sizes, and four large General Vehicles, and letting out the last of the horses.

The present Sloane equipment consists of one 500-pound salesman's car; one 1,500-pound special delivery car; two 1 1-2-ton wagons and nine 3-ton trucks. It was announced February 1 that the company had also ordered another 1 1-2-ton truck and one of 3 tons capacity.

The service required by a big carpet house is exceedingly trying. It is subjected to terrific pressure at certain seasons and is difficult to keep steadily employed at certain other seasons. An extraordinary mileage is required a certain day and nothing at all on another.

While economy of operation is always desirable, it is not the chief essential in delivery work. Speed, certainty and reliability are ranked ahead of minor differences in cost. Of course, other things being equal, the car that costs less to operate has an advantage over one that costs more.

"Keeping on the Job" a Big Factor

Ability to keep on the road delivering service is the prime quality in truck operation. Guarantees covering trucks of all kinds are similar as to material and workmanship; tire mileage on solids is generally guaranteed; oil and gasoline consumption are not materially different for standard trucks of a given size and the cost of an annual overhaul does not vary greatly with the make.

Therefore, the chief element of truck service is the quality of the truck itself and the facilities present to keep it at work.

In addition to the service plant of the White company in New York, the Sloane concern has its own commodious garage and machine shop, equipped with electric power for its machine tools and devices. It has a 500-gallon gasoline storage system for measuring fuel into the tanks of its cars and storage facilities for the cars themselves.

The bulk of the work done for the Sloane company is accaccomplished with the 3-ton gasoline cars. These cars are required to deliver an average of 42 miles a day for an average of 296 days a year. The cars of this type are equipped with solid tires, single in front and double on the driving wheels. The gasoline consumption is 1 gallon for 7 miles. Oil consumption is 1 gallon to 100 miles and an annual overhauling, including replacements, costs $250. The annual wagon mileage of these trucks, reckoned at the average figures, is 12,332. A set of tires costs $300 and at the guaranteed figures it would take 1 1-2 sets for a year's work, which bring the cost up to $450.

This item may be reduced in case a rigid limit is set as far as speed and overload are concerned. At 15 miles an hour maximum and at rated load tires give something over 10,000 miles, but in delivery work there are frequently overloads and overspeed. Consequently the guaranteed mileage is close to actual figures.

With gasoline consumption reckoned at 7 miles to the gallon, costing 11 cents a gallon, the annual consumption would be 1762 gallons or $193.82. Oil consumption would be 123 1-3 gallons, which at 30 cents a gallon would mean $37.

Many Items Make Up the Cost

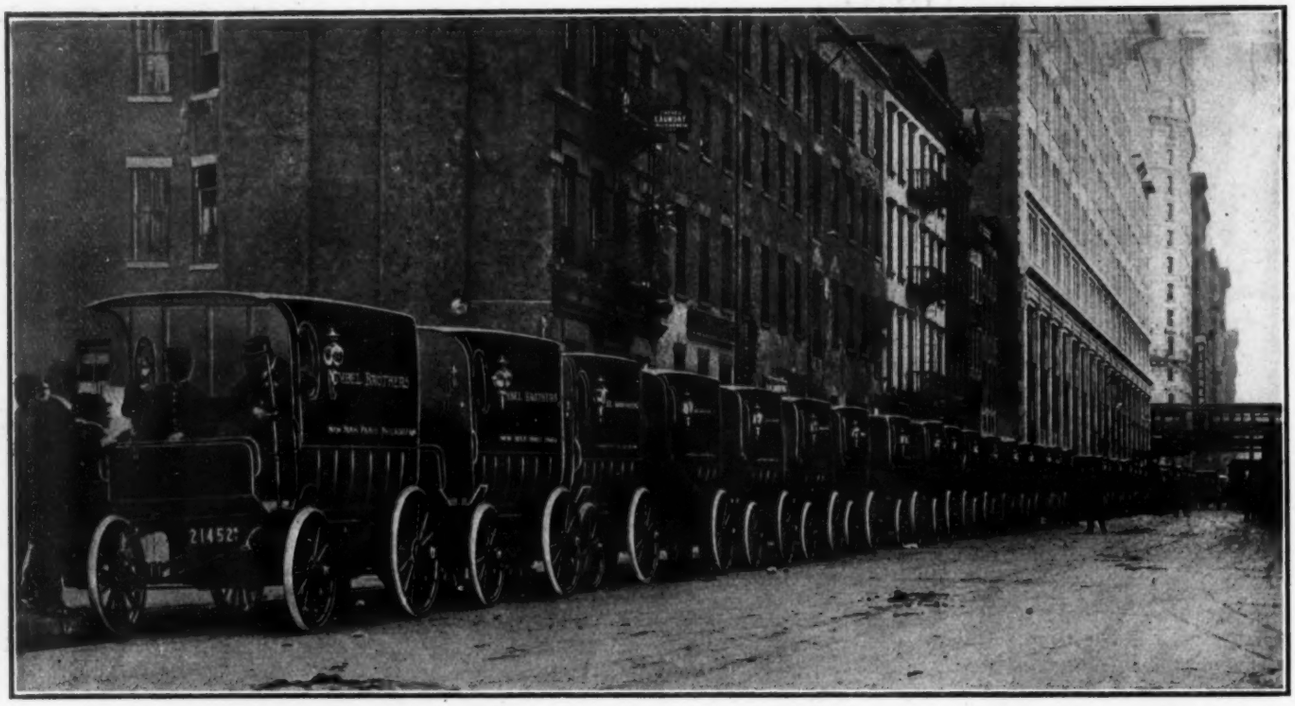
Storage, as far as the Sloane company is concerned, is a difficult matter to estimate because the company owns its own garage, but the care of a 3-ton truck and its space in a garage are worth $20 a month, because it would cost more than that amount to store it outside.

The interest on the purchase price and the amount set aside for sinking fund are variables, the latter particularly. But if such items are to be charged against operation at all they should be definite. In this case, $231 for interest and 15 per cent. for sinking fund and insurance, or $577.50.

The wages of two men may be included in the total cost of transportation service rendered by the truck. This item will average close to $1,250.

Thus the total cost of operating and maintaining such a truck must be $3,229.32 a year, delivering 12,332 miles, half of which total is under load. On this basis of 6,166 load wagon miles, the

Type of Sampson truck used for heavy department store work



Fleet of Studebaker electric delivery wagons in the service of Gimbel Brothers' New York store

total cost would be a little over 50 cents and the ton mile rate would be about 17 cents.

The usual basis of figuring operative costs disregards garage rentals, wages of crew and sinking fund, but includes insurance. This may be figured at $80 a year. The total cost of operation on that basis would be $1,241.82. This would make a load wagon mile cost of 20 1-10 cents or a ton mile rate of 6 7-10 cents. In both these reckonings, the empty travel of the car is disregarded and the whole cost is laid against the mileage at which full load is carried.

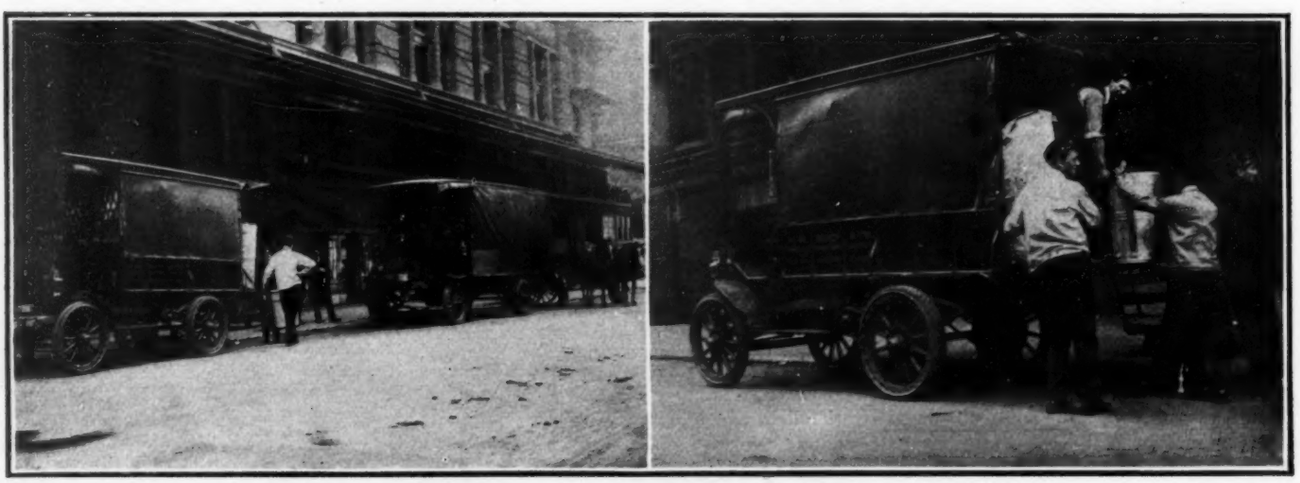
Ton-Mile and Wagon-Mile Costs

On a straight wagon mile basis the entire cost of operation, including all the items specified, would be 25 cents and with the deductions enumerated it would be a trifle over 10 cents.

In the case of the 1 1-2-ton trucks the gasoline consumption must be rated at 10 miles to the gallon. These trucks run further and faster than their big brothers and in several cases pneumatic tires are employed. The guarantee on pneumatics is 3,500 miles and in cost they approximate solids. At 14,000 miles a year, they require four sets of pneumatics unless driven at moderate speed and under moderate load. With solids 8,000 miles is guaranteed. The tire cost of pneumatics would be $1,200 and with solids $525. Gasoline cost $145 and oil $35. The overhaul would be about the same, being rated at the same figure, $250, which of course is less than for the 3-ton trucks on a mileage basis. The interest charge is less by $42 and the sinking fund and insurance are less by over $100. The storage and wage items would be practically the same. The wagon miles would be 14,000 and the load ton miles 10,500.

The total cost of operation and maintenance using pneumatics would be $3,781.50 or 28 cents a wagon mile. The rate per wagon mile under load would be 56 cents and the ton mile rate 37 cents. By using solids this cost is reduced to a little over 30 cents a ton mile, including all the items of cost. With the usual eliminations of the items specified in considering the 3-ton truck the ton mile cost would be, using pneumatics, 16 1-3 cents. With solids it would be 10 cents.

The special delivery wagon of 1,500 pounds capacity is faster and lighter than the foregoing wagon. It is equipped with



The Randolph trucks included in Macy's equipment have given long and faithful service

Showing various types of Knox vehicles used by New York department stores

pneumatics all around with duals on the driving wheels. The ton mile cost under load runs up sharply because of the great strains imposed on the car.

Its use, however, is limited and its total mileage delivered averages lower than the other cars. Figures on operation for this type and the salesman's car are inconclusive. The gasoline consumption is about 1 gallon for 13 miles and the tire consumption is close to the guarantee. The salesman's car is a stock pleasure car chassis and gets 15 miles from a gallon of gasoline.

In tabular form the cars figure as follows:

Type No.	Tires	Gas	Oil	Overhaul	Ins.	Int.	T-Mile	Totals
1½ Ton 2	$1200.p	$145	$35	$250	$70	$189	.16½	$1889
	525.s						.10	1214
3 Ton 9	450	193	37	250	80	231	.067	1241

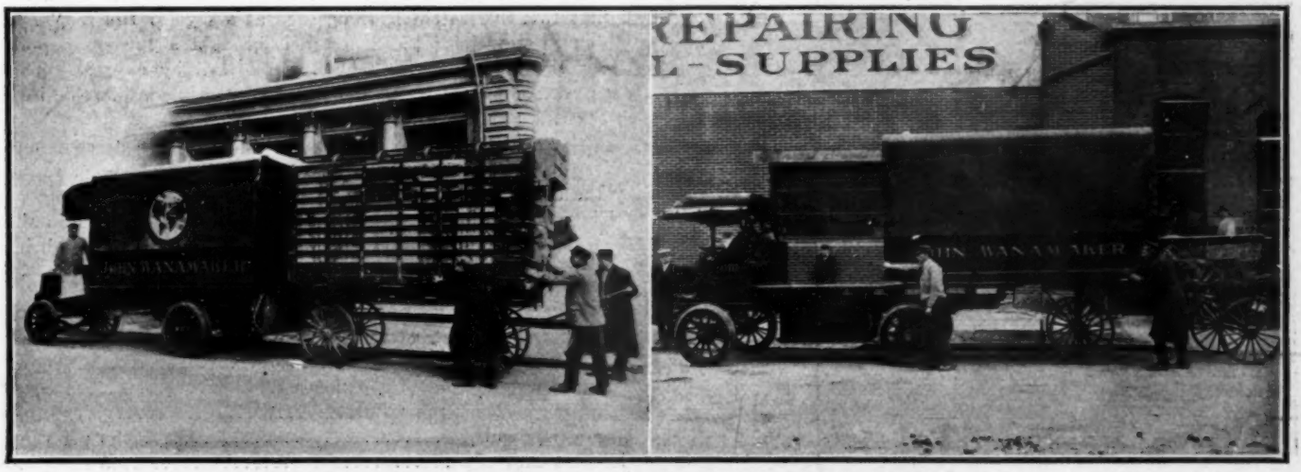
Equipment of Stern Brothers

Stern Brothers' big department store on West Twenty-third street has used automobile trucks since 1902, when several General Vehicles were installed. Even today, when the company has extended its line of power wagons to ten, two of which are 2-ton electrics, fully 80 per cent. of the delivery work is done by horse-drawn vehicles. Since 1907 records have been kept of operative costs, and, while complete details are not available, some interesting totals are presented.

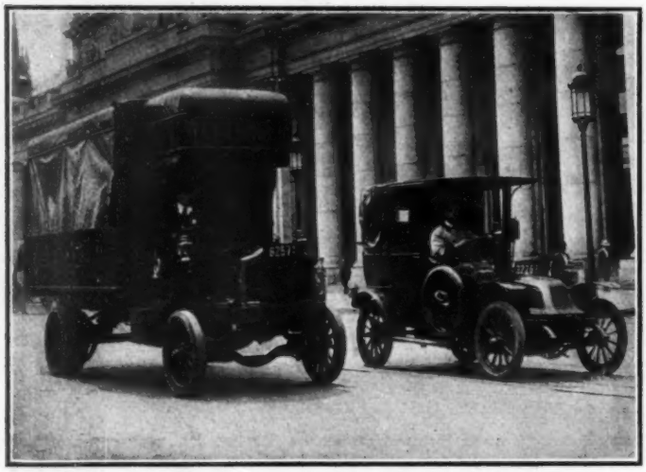
A digest of the figures shows that the total operative and maintenance cost of an automobile unit in this service is $1,779.98 a year. Horse-drawn equipment delivering an equal amount of service for this company cost $3,892.08 a year, or about $2,100 more than the automobile. It would require the work of six horses to do an equal amount of delivery.

The ten cars included in the delivery equipment are used for long, straightaway hauls to the various distributing stations of the company. These are as far away as Mount Vernon, middle Long Island and suburban New Jersey. Actual house-to-house deliveries and traffic work are done by horse and wagon. The mileage required of the automobiles ranges from 25 to 45 miles a day, with the average just below 40 miles. The electric 2-ton trucks deliver an average of 34 miles a day.

The operative cost of the electrics in 1907 was $1,489.20 and in the following year it was $1,458.73 per unit. At that time



The Wanamaker delivery department has found nest bodies very useful in saving time



One of the Packard trucks in the Wanamaker service

the mileage requirements were not so high as they are at present, but the wagon mile rate of a little less than 29 cents was the same as it is now.

Excellent Record of a 2-Tonner

An interesting record was kept in 1909 of the service of a Knox air-cooled car of 2 tons capacity. The car was used for extraordinarily long hauls in competition with the express companies and was pushed to its outside limit in certain seasons. During the year it only delivered 9,204 miles, indicating that it lay idle for much of the time. The expense of operation during the year was divided as follows:

The car was equipped with a brand-new set of tires at the outset and the charges for tires were only made when replacements were required. Thus the tire bill for the year was $188.93.

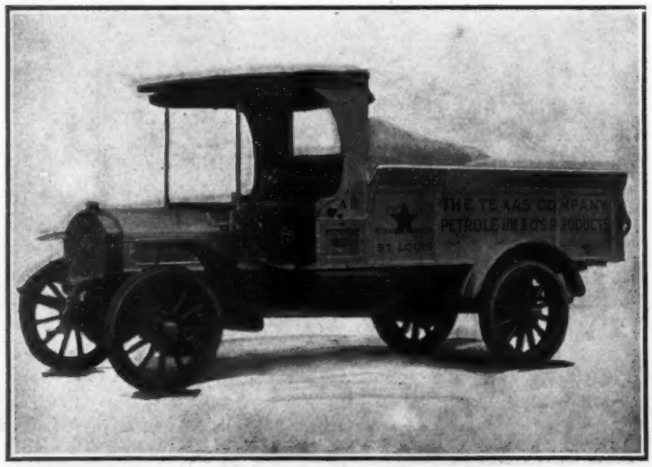
Gasoline cost $355.30 and oil, owing to the fact that the truck was of the air-cooled type, which at that time required much lubrication, cost $101.45.

Grease, waste and kerosene cost $8. Storage was charged at $300 and overhauling, repairs and replacements cost $262.10.

This makes a total for pure operating costs of $1,215.78, or 13 cents a wagon mile. Half the mileage was under load, which gives a load wagon mile cost of 26 cents or a ton mile cost of 13 cents.

By including sinking fund, wages, insurance and interest, this ton mile cost is raised to 29 cents for a straight wagon mile or a load ton mile.

Comparison of the service of this truck with the cost of express service shows a difference in favor of the truck of $1,000 for the year covered by the illustration.



Type of Mack truck used by New York's big stores

A new Knox 2-ton water-cooled truck installed last winter made a peculiarly creditable showing, as is indicated by the following figures and items representing the expense from January 1 to April 1. Storage for the 3 months was $72, gasoline $88.38, oil $8 and other supplies $8.

The total outlay was $176.38. The truck covered 3,432 wagon and ton miles, which figure 5 1-10 cents. No item for tire cost is included because no replacements were needed by any of the machines.

While strenuous service is required of the Stern equipment, there are two excellent rules in force to insure economy of operation. The driver who overloads or overspeeds his car is subject to discharge. The rules are enforced and as a result tire expense is shown on a very favorable basis. It is remarkable how careful a driver can be when he has to be.

The company has several Renault wagons equipped with pneumatics. One of these is a two-cylinder delivery wagon rated at 12 horsepower and used in the Brooklyn service. The car has a capacity of 1,500 pounds and is driven on an average 57 1-2 miles a day.

The average monthly cost of operation alone, not reckoning tires, is divided into the following items and amounts:

Storage $20; chauffeur $78; boy $30; gasoline $15; oil $3 and other supplies $3. Total $149 or 10 1-2 cents per wagon mile based on its average run. Tire cost would raise this rate to 16 cents.

Hewitt delivery operated by Best & Company

A smaller Renault operates at the rate of 14 cents a wagon mile.

The company uses several Randolph trucks and no fault is found with service or cost. The conclusion is drawn from the figures that in straight hauling, such as a regular run to Mount Vernon, a saving of $60 a month is brought about in comparison with similar service that is performed by express. This does not seem a large sum, but it constitutes a considerable item at the end of the year.

With regard to the Stern equipment a tabulation of costs and mileages would only confuse and owing to the objection raised by the company it is omitted.

The conclusions from operation, however, as outlined in the foregoing are of much interest and may be set down in a brief form as follows:

Operative cost for automobile unit	$1,779.08
Corresponding horse equipment (6)	3,892.98
Average wagon miles per unit	11,890.02
Cost per wagon mile (full expense)	29 cents
Operative cost per ton mile	13 cents
Horse equipment	80 per cent.
Gasoline cars (8)	16 per cent.
Electric cars (2)	4 per cent.

Simpson, Crawford Company's Equipment

The delivery system of the Simpson, Crawford Company consists of over 400 horses, 200 wagons and fifteen motor trucks. These vehicles deliver all goods from the Fourteenth Street Store, as well as from the store of the Simpson, Crawford Company. All are arranged on regular schedules, the gasoline trucks being used to carry the merchandise to suburban stations, where it is loaded on the horse-drawn vehicles which finish the delivery by taking the packages to the addresses marked.

The trucks stop at the Fourteenth Street Store on their way from the garage and pick up the goods billed for their respective schedules. Then they load up at the Simpson, Crawford store and proceed on their way to the suburban stations. Superintendent Nolan says that he has found the trucks invaluable. They cover twice the distance in a day that the horses can travel, carry nearly twice the load horses can pull and generally take about half the time to make trips.

Both gasoline and electric trucks are used by the company, the fleet comprising eight electric Walker wagons, five Grabowsky gasoline cars and two Sampson gasoline trucks. The light electric wagons, besides delivering parcels direct to the houses of purchasers, have done away with a whole suburban stable, including forty-five horses, a number of men and the double handling

Chase light delivery used by Stern Brothers

of the goods which was formerly necessary. The electric wagons have been found more efficient than the horse system, not only in saving time in reaching points and in delivering direct to the purchaser's house, but also in that they are more reliable, repairs being seldom, if ever, necessary.

The gasoline trucks have been found equally dependable, often working 24 hours a day without a pause. The repairs are practically negligible. Each of the Grabowsky trucks is supplied with an extra engine. Thus, when the truck is under a prolonged strain, as in all-day and all-night work, the driver simply loosens a few bolts, slides out the engine and, almost in a twinkling, replaces it with another which has not been working for several hours at least. In this way the wear upon the engines is reduced to a minimum and all the engines are kept in the best possible repair, as after each change of engines the one which has been removed is inspected and, if necessary, adjusted. The average working time of all the gasoline cars is from 18 to 22 hours a day. The electric vehicles work about 10 to 14 hours a day and are recharged during the night.

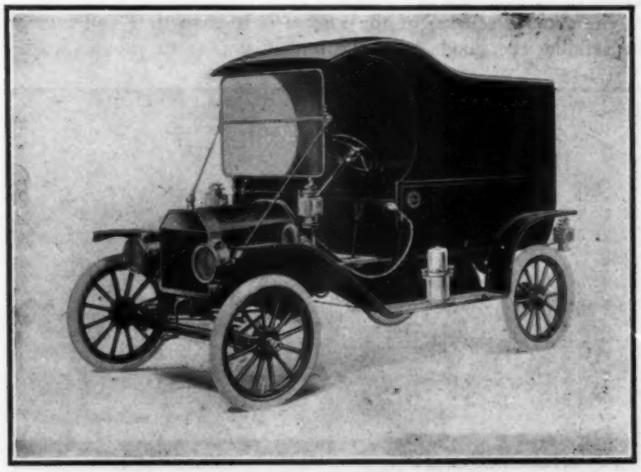
The gasoline cars cover from 75 to 100 miles a day, several trips of varying length being made. The average daily mileage of the electrics comes to about 50 or 55. All this distance is made by the electric vehicles on a single charge of the batteries. The gasoline cars average 10 miles to a gallon of fuel. Each car uses from 7 to 10 gallons a day. This, at 11 cents a gallon, amounts to about 85 cents a day per car. The oil used in a day

One of the General Vehicle electrics used by Wanamaker's

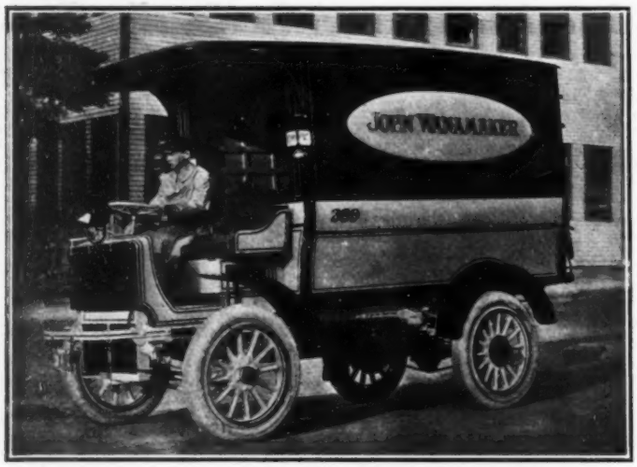
generally comes to about 25 cents for each truck. This compares very favorably with the cost of maintaining a two-horse team, and, when the amount of work done is considered, is found to be far less expensive. The wages of a motor-truck driver are higher than those of an ordinary driver, of course, the average truck driver's wages amounting to $18 a week. The helper costs the firm $10 a week. Thus the cost of operating the truck comes to about $5.50 a day, including the pay of the men. The company buys its gasoline and oil in bulk, thus securing a reduction of several cents a gallon, which means a great deal in operating a large fleet of trucks nearly every day in the year.

Gasoline Cars Do Heavy Hauling

The gasoline trucks are operated on a different scheme from the electric wagons. The latter are so much lighter that most of their loads are made up of rather small bundles and parcels. The big gasoline cars, however, carry the large, heavy goods. Mr. Nolan has drawn up three card-forms for keeping track of the trucks handling the heavy articles. One of these forms, that used by the night trucks, is shown on page 445. The other forms are made out for piano trucks and furniture, respectively. These differ only slightly from the one in the illustration. The driver fills out a card for each time the truck is in service. For example, the card shown reveals that on February 7 Driver James was on duty on Grabowsky truck No. 10 from 7 p. m. until 6 a. m. During this time the weather was good and four trips were made, which totaled 76 miles. The truck consumed 7 1-2 gallons of gasoline and 1 1-4 quarts of oil. No repairs were necessary and the truck was in the stable at 6.15 a. m. These cards tell the men in charge everything



Type of Ford light delivery used by New York stores



Closed-body Autocar used in Wanamaker service

that they want to know at a glance. Of course, the trucks in the three divisions are changed about to meet the requirements of circumstances. The average load of the night trucks is nearly 3 tons, whereas the two-horse teams used before the trucks were adopted could not pull more than 2 tons at less than half the speed attained by the motor vehicles.

Reducing the cost of delivery to a package basis, Mr. Nolan says that with the horse system each package that was delivered cost the firm 6 cents, while with the motor trucks each package costs only 2 1-2 cents. Besides this gain, the territory which can be covered by the delivery system has been increased so that more people take advantage of it to make purchases at the store, which they would not do if they thought they had to carry the articles home. Moreover, the delivery of goods is made much quicker by the trucks. Formerly, under the horse régime, the men would be out until 10 or 11 p. m. on a delivery trip which they now cover so quickly with the motor truck that they have returned to the store by 5 o'clock.

Macy's System a Large One

R. H. Macy & Company have a very large delivery system, consisting of over 200 horses, 150 wagons and forty-two motor vehicles. Of the latter, thirty-five are electrics and the remaining seven are gasoline cars of various makes. Some of the big gasoline cars are of 3 1-2 tons rating and are used for transferring large quantities of goods to distributing points. Others are of 1-ton capacity and serve to make the long-distance hauls to outlying districts which are too far away to be reached by the electric vehicles on a single charge of the batteries. The electrics are used for intermediate hauls, covering distances too great to be economically handled by the horse-drawn wagons.

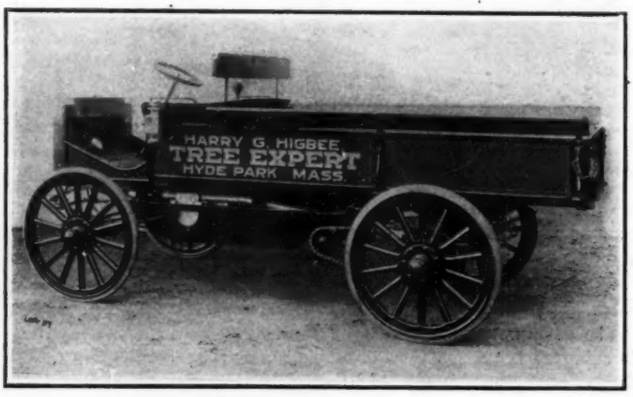
The general scheme of the system is to save time and money by sending the goods over the long distances to suburban stations in the motor trucks. At the stations the trucks deposit their loads and return to the store for more while the horse-drawn wagons distribute the goods in their respective territories. In this way the trucks are kept on the move most of the time. The gasoline trucks average about 75 miles a day, the electric cars about 35 or 40 and the horse-drawn wagons about 11 miles a day. The electric vehicles are fitted with both lead-lead and nickel-iron batteries.

Records are kept for each day the motor trucks are in service, each driver making a daily report as well as the inspector. These are kept on file in the office. From these records the average cost of operation of electric vehicles equipped with lead-lead batteries is 11 cents a mile. That of the electrics equipped with nickel-iron batteries is 10 cents a mile. The cost of operating a 3 1-2-ton gasoline truck was found to be 5 cents a mile. None of these figures cover any items except those of upkeep, gasoline and oil. In the case of the electrics, of course, the cost of charging the batteries takes the place of the cost of fuel and oil. Like most of the department stores, the company has found that electric and gasoline trucks are most efficient in their own spheres.

Kesner Claims Fastest Service

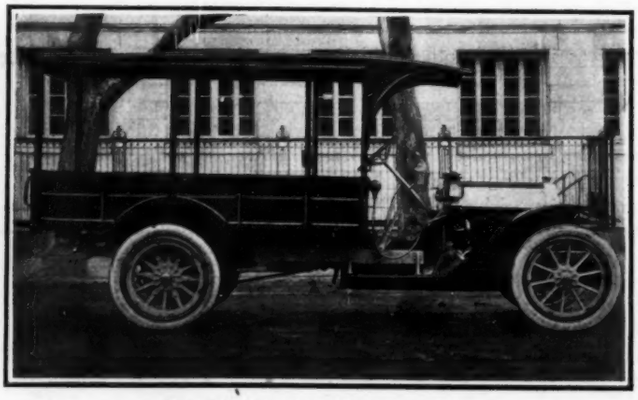
J. L. Kesner & Company are very proud of their delivery system, which, they claim, is the quickest in New York City, if not in the world. This concern has gone over to automobile trucks entirely, using no horses at all in the delivery service which is handled by forty-two 1-ton Grabowsky gasoline trucks and three 3-ton cars of the same make. The 3-ton vehicles are used for all heavy hauling, carrying pianos, stoves, etc. The 1-ton trucks deliver direct to the houses of the purchasers of the goods. There is no double handling necessary with this system, as Mr. Tibbs, the head of the company's advertising

Trucks Suitable for Delivery



Little Giant 1-ton wagon

Law 1½-ton truck showing radiator on dash



One of the new 2-ton Premiers

department, pointed out. This, of course, saves time, labor and expense.

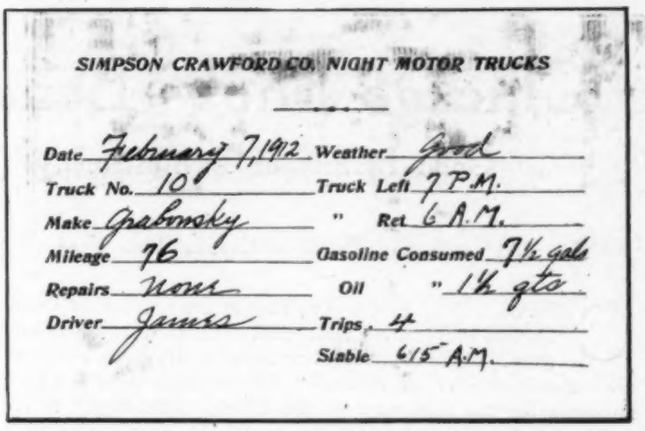
The cars run almost all the time, the trips being a continual round, and the constant strain is rather hard on them, but Mr. Tibbs says that they stand up nobly under it. Repairs are very seldom necessary. When the trucks were purchased, the company made a contract with the Grabowsky company that the latter should keep the trucks in good condition all the time for a certain sum. This is part of the system. Mr. Tibbs says that the Grabowsky company has filled the contract splendidly with the result that the trucks are always ready to run and are always on the go. The interchangeability of parts of the trucks is a great convenience, Mr. Tibbs says, as they may be changed about to suit conditions.

As with the delivery organizations of the other stores, there is a regular system of record-blanks to be filled out by the men, as well as a checking system. Mr. Tibbs says that the trucks are much more satisfactory and more economical than were the old, horse-drawn wagons.

The Lord & Taylor Equipment

Lord & Taylor, like nearly all of the stores mentioned in this article, has a combination system of delivery, using both horses and wagons and gasoline trucks. The company has 124 horses and some sixty wagons. The automobile-truck equipment consists of eleven 1 1-2-ton Autocars and two 2-ton Alcos.

The trucks are used for transfer work most of the time, carrying large loads of merchandise to points whence the goods are distributed by the horse-drawn vehicles. Very often, however, the trucks are put on routes just like the horse-drawn wagons and deliver goods direct to the houses of the purchasers. The head of the department, Mr. Langenbacker, says, however, that


SIMPSON CRAWFORD CO. NIGHT MOTOR TRUCKS

Date February 7, 1912 Weather Good
Truck No. 10 Truck Left 7 P.M.
Make Grabowsky " Ret 6 A.M.
Mileage 76 Gasoline Consumed 7½ gals
Repairs None Oil " 1½ qts
Driver James Trips 4
Stable 6:15 A.M.

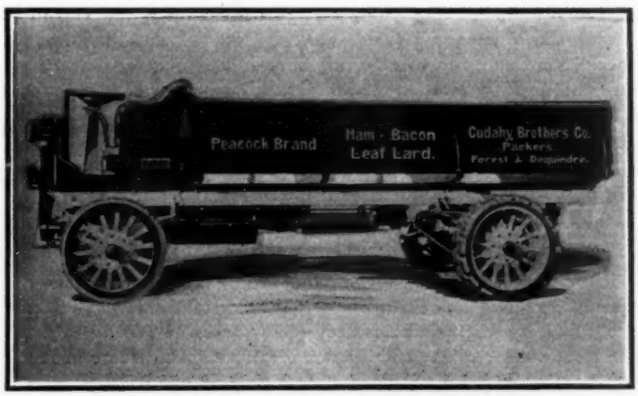
How Simpson, Crawford Company keeps tab on night trucks

his aim being to secure the maximum efficiency at the least expense he finds that a careful study is necessary each day to determine in which direction each part of his equipment will be of the most service.

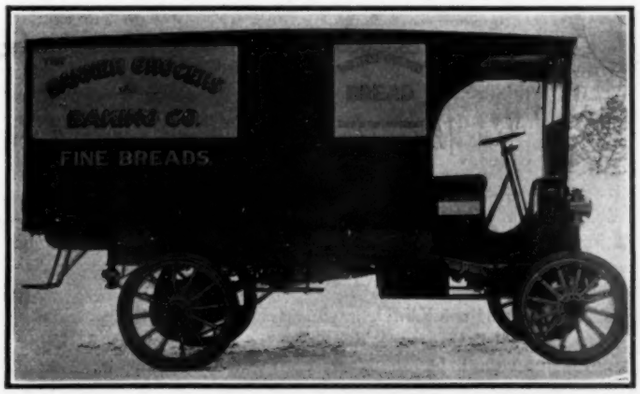
Wanamaker's System Largest in City

The Wanamaker delivery organization uses horse-drawn vehicles, electric trucks and gasoline commercial cars. The concern has 275 horses, which are generally used in teams, and 150 wagons. The General Vehicle electric cars and sixty-one gasoline trucks of various makes comprise the motor-driven equipment. The Wanamaker system has a number of suburban stations to which the motor trucks carry the goods and whence they are distributed over the various routes by the horse-drawn wagons. To secure the greatest possible efficiency and to save time and keep the trucks on the move, nest bodies are employed. These are large crates which fit inside the truck bodies. There are two to each truck and one is being loaded at the store while the truck is on the road with the other. Thus, as soon as a truck returns from a trip, the empty nest is taken out for reloading and a loaded one is slipped into the truck which is immediately on its way.

Service Exhibited at Chicago



Kelly truck of large capacity

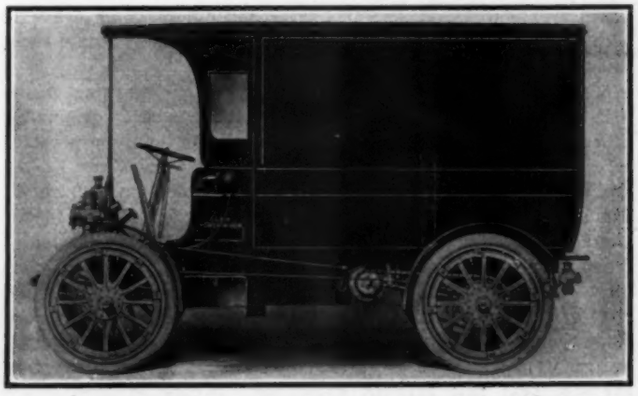


U. S. truck with drop frame

Illinois Dealers Organize

CHICAGO, Feb. 3—The Automobile Dealers' Association of Illinois was organized Wednesday when thirty-six dealers met at the offices of the Motor Car Supply Company, 1451 Michigan avenue and elected H. E. Shellebarger of Decatur temporary chairman and J. H. Munay of Bloomington secretary.

An executive committee consisting of J. C. Thorpe of Champaign, D. Estaque of Jacksonville and J. H. Munay was appointed to draft a constitution and by-laws. Great interest is being manifested by the dealers in this movement, and their next meeting will be at Bloomington, February 22.



Clark power wagon with closed body

Chicago Show Benefits Trade in West

Good Effects of Exhibition Will Be Felt Well Into the Spring

Prospects for a Big Trade in Canada This Year

CHICAGO, ILL., Feb. 6—Car makers are not the only exhibitors who express great satisfaction with the Coliseum show. Manufacturers of accessories and parts likewise are enthusiastic over the results of the first three days and the prospects for the remainder of the Chicago exhibition. It is the practically unanimous opinion at all the booths that the present show will outdistance as a business getter any previous attempt either in Chicago or elsewhere. This state of affairs is universally attributed to the prospects for good crops throughout the country. The blanket of snow which is lying late over the fields of the greater portion of the country augurs well for heavy crops this year and the old saying has been modernized into: more rain, more corn; more corn, more hogs; and more hogs, more automobiles.

It is confidently believed that the beneficial effects of the show will be felt throughout the entire West well into the spring months.

Dealers to the number of 2,000 have already registered with the show office. They represent a territory from Pittsburgh to the coast, a general recognition of Chicago as the Western buying center of the industry. It is expected that the number of dealers will be increased many times over by those who are holding off their visit until the latter part of the week for the commercial show which now holds the boards.

Compared with last year's Chicago show, this is expected to be much more successful, both on the basis of actual sales and on the lining up of prospects. As against the two exhibitions at New York, accessory makers on the whole say that not only is there more business done but the sales are more easily made. This is attributed to the difference in temperament between the people of the two sections; the Easterners being much more sceptical than their Western cousins.

Happiness reigned in the Stewart speedometer booth where it was stated that more sales were made in the first three days of the Chicago show than in the whole two weeks of the exhibition in New York. Sales amounting to over $5,600 were credited to one salesman for Tuesday and a contract was closed for 500 instruments to go to one factory.

Many of the accessory makers, particularly those who deal direct with the manufacturers, have their year's output contracted for and are exhibiting merely as a general publicity measure and in some cases are closing contracts for 1913 business. Among the parts makers, in the Gemmer booth, the Warner exhibit, the Auto Parts space and others, good business with plenty of prospects is reported and many makers state that sales are only limited by factory capacity.

Motor manufacturers report that buyers are warning them that more engines will be taken than the contracts originally called for, and in the Rutenber and Waukesha booths a greater accession of business is expected during the truck show.

Tire makers are jubilant over the early business and contracts for new agencies are reported from practically all of them. United States Tires reports many contracts with new agents from Pittsburgh to San Francisco, and says that this is the most successful show ever held from a business standpoint in spite of the fact that most of the contracts have been closed for some time. In the Fisk booth contracts throughout the country are reported while a representative of Lee tires is authority for the statement that between fifteen and twenty agencies have been allotted with good prospects of the total for the week reaching 150. It was not expected to get so much business so early in the week. One tire representative reported $12,000 of agency business done yesterday.

The magneto and carbureter manufacturers are equally well pleased. Bosch magneto salesmen report that they are kept busy caring for prospects. A Stromberg representative reports a sheaf of contracts with manufacturers and jobbers and says that business is better than was evidenced by the returns from the New York show. The Schebler, Rayfield and Kingston people all report good business.

Kline Company Building a New Factory in South

Industry Growing in Canada

TORONTO, ONT., Feb. 5—There are now fourteen automobile factories in Canada and the output for the year exceeded 1,200 cars. In 1905 there were only about 500 cars owned in Canada. Today there are upward of 16,000 owned in the Province of Ontario alone. Most of the cars used in Canada are imported from the United States, and all but two or three of the factories in this country bring in most of the parts and assemble them here, but the aim of the larger concerns is to build the complete car here, and there will then be a more generally satisfactory class of car for general use in Canada, as the manufacturers will give more attention to the specifications of a car adapted to the varying conditions of the highways and byways of the Dominion. The pioneer in this direction is the Harding Motor Car Company, of Newmarket, Ont., which is building a special runabout for 1912 having a road clearance of 10 inches and the artillery type of wheel. It will require years to effect a very considerable change in the highways of Canada and, until then, the motorist must be prepared to encounter frequent stretches of abominable roadway in whatever direction his automobile is headed.

Kline Company Builds New Factory

RICHMOND, VA., Feb. 3—The Kline Motor Car Company, which was incorporated here several months ago and in which local capitalists are interested, has acquired 15 acres of ground beyond the Boulevard, and abutting the state fair grounds, where ground has been broken for the plant, which will be one of the largest in the entire South.

The factory site has a frontage of 1,300 feet along the Seaboard Air Line Railway's property, and 1,225 feet on the Boulevard. With sidetracks of the Seaboard running into the yards the question of drayage will be eliminated. Since the incorporation the Kline Motor Car Company has been having the Kline car manufactured at York, Pa., under contract, but as soon as the Richmond plant is completed the cars complete will be manufactured here.

It is expected that the plant will be completed by the first of July. The building, which will be of brick, with concrete foundations and floors, is really two buildings in one. Each will be 600 feet long and 60 feet wide. It will be of colonial style, two stories high.

The officers of the Kline company are: S. W. Bailey, president; Samuel W. Meek, vice-president and treasurer; James A. Kline, general manager; D. R. Mydyett, secretary; Warner Moore, chairman executive committee.

Late News From the World of Industry

Detroit Makers Don't Believe Automobile Export Figures

$20,000,000 Sent Abroad From That City Alone

DETROIT, MICH., Feb. 5—Detroit motor car manufacturers take exception to the report recently issued by the Department of Commerce and Labor showing that the exports of automobiles from the United States in 1911 amounted to $20,000,000. They assert that the exports from Detroit alone were in excess of $20,000,000 and they produce the figures to prove it. Here are the 1911 exports reported by several of the leading manufacturers that have developed a foreign trade:

Ford Motor Company, $9,000,000; Lozier Motor Car Company, $250,000; Regal Motor Car Company, $600,000; Warren Motor Car Company, $195,000; Studebaker Corporation, $6,000,000; Packard Motor Car Company, $600,000; Cadillac Motor Car Company, $1,750,000; others, $750,000. One concern that did not care to have its name used gave its exports for the past year as $900,000. These figures total $20,040,000, and do not take into account a number of firms that have developed an extensive export business within the past few months. In the light of this showing it is up to the Department of Commerce and Labor, the manufacturers think, to revise its tabulation.

Detroit and Michigan will be well represented at the commercial car show in Chicago this week. No less than a score of big mercantile firms of this city will send officers or other representatives to look over the cars with a view to buying, while officials of several cities in the state will go over to size up the display. Among the Detroit officials who plan to attend are Public Works Commissioner Haarer, Park Commissioner Hurlbut and Robert Flowerday, superintendent of parks. Commissioner Hurlbut has put in an estimate this year for five new automobile 'buses and he is particularly interested in this type of car. All the city departments are making increased demands for motor cars this year.

The Detroit fire department has just received a motor fire engine of an unusually powerful type, manufactured by the Robinson Fire Apparatus Company, of St. Louis. It has a capacity of 900 gallons of water per minute, 200 gallons more than either of the two motor fire engines now in commission.

Ford dealers from Toledo and other northwestern Ohio points were entertained by the Ford Motor Company last week. The unique part of the affair was that every dealer brought his banker along, the company numbering 103 persons. The party was headed by the officers of the Roberts Toledo Auto Company, organized three years ago by Stanley Roberts, formerly of Detroit. The visitors spent nearly a whole day in the Ford plant, with an intermission for luncheon at the Log Cabin Inn, and were guests at a banquet in the Cadillac in the evening.

To increase their facilities in response to the demands, several Detroit motor car manufacturing concerns have found it necessary to enlarge their capital. The Krit Motor Car Company has raised its capitalization to $500,000 from $250,000 and the Commerce Motor Car Company from $25,000 to $50,000. The Argo Electric Vehicle Company, of Saginaw, has boosted its capital from $200,000 to $400,000. Still another local concern to take on additional capital is the American Auto Trimming Company, which jumps from $50,000 to $150,000. Recent incorporations reported by the secretary of state are as follows: Miller Car Company, Detroit, $50,000; Detroit Battery & Ignition Company, Detroit, $200,000.

Evidently the Abbott Motor Car Company has changed its mind about withdrawing from racing, for it has filed a strong protest with the Contest Board of the A. A. A. against the six months' suspension order recently made. The company asks to be reinstated and expresses its willingness to abide by the rules in the future.

Rush Work on Newtone Factory—Other Trade News

Toledo Garage Charges Advance

TOLEDO, O., Feb. 4—There will be an advance in the price of storage and other garage service in Toledo, according to announcements sent out by several of the garage managers to their patrons. The assertion is made that no money is being made under the old rates and that many garages in the city have been operating at an actual loss. This is especially true of the exclusive garages, which have no auto-sales department to balance the account. It is claimed that during the past two or three years the cost of service has greatly increased, while the price of storage has remained the same. Garage charges here have been exceptionally low as compared with other cities of the same class. Some of the local concerns will retain their old schedules for a time at least.

Pierce Truck Makes Long Run

BOSTON, MASS., Feb. 5—J. E. Cunningham and Fred Bradbury, of the J. W. Maguire agency, made a remarkable run a few days ago with one of the 5-ton Pierce Arrow motor trucks. Starting from Boston at 9 o'clock in the morning Worcester was reached at 12:30. Although the roads were heavily iced no chains were needed. After a demonstration there the truck started at 2:15 for Springfield, reaching there at 6. The next day the truck was driven to Greenfield through snow in some places 2 feet deep. From there the run continued to Brattleboro, Vt., where the truck was delivered. The run was a great success from start to finish.

Newtone Factory Is Rushed

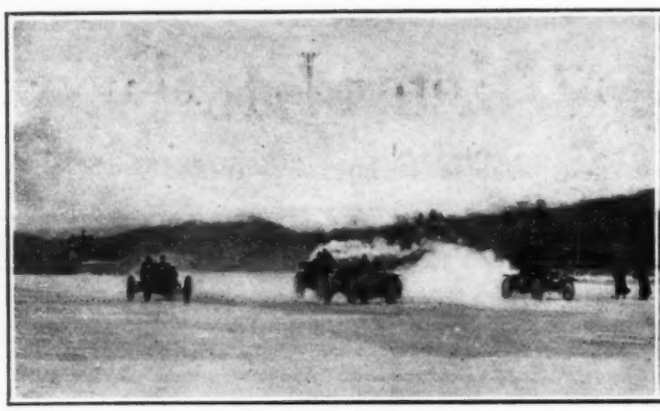
The Automobile Supply Manufacturing Company, Brooklyn, N. Y., manufacturer of the Newtone electric horn, has prepared to increase its capital stock to $500,000 fully paid.

The Automobile Supply Manufacturing Company has been producing automobile bulb horns for the last 7 years on a large scale.

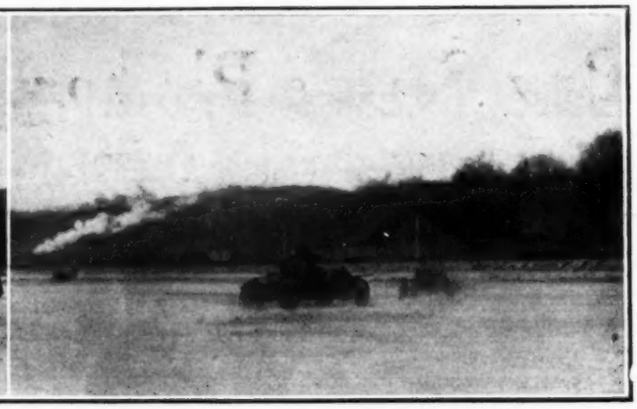
Since its advent into the electric horn industry this branch of the business has grown materially, requiring additional floors, and at present the company is equipping the addition with up-to-date machinery. The entire operating force is working overtime on the production of the electric horn.

Aristos to Handle Disco in West

CHICAGO, Feb. 6—The Aristos Company, of New York, which is the distributing agent of the Mondex line, has secured the Middle West territory for the Disco starting apparatus. This takes in Indiana, Illinois, Iowa, Minnesota, Kansas and Missouri, which territory was formerly in the hands of John H. Palmer. The eastern territory for the Disco was already in the hands of the Aristos Company. Mr. Palmer continues with the organization and will take charge of the Middle West with headquarters at Chicago.



Start of mile straightaway race on Hudson



Mercedes and Mercer negotiating ticklish turn

Rare Sport in Winter Racing

Hudson and Shrewsbury Rivers Form National Ice Speeding Courses

THE cold weather in this section of the country has given a boom to automobile racing on the Hudson. Almost any day one or more fast cars can be seen whirling over the ice-bound river and occasionally a group of flyers will indulge in some fast competitive work.

Last Saturday a Mercedes driven by N. Koenig, Mercer driven by M. R. Beltzhoover, a Stanley driven by J. Bell and a Cadillac guided by T. W. Lawson, agent for that make at Tarrytown, indulged in a spin over the ice at full speed.

A course had been laid out approximately 1 mile long with an approach of about a mile and an equal distance beyond the finishing line. The cars got under way and hung together until reaching a point opposite the Maxwell factory near Tarrytown, where the starting line had been fixed. From that point there was a wild sprint to the other end, the Mercedes leading and making close to 75 miles an hour.

The express trains of the West Shore railroad have had to eat a lot of dust, or whatever corresponds to dust in ice racing, recently. When the cars are on the ice and a West Shore train appears in either direction, the drivers demonstrate how much faster their cars are than the locomotives.

On the speedway referred to there is a sharp turn necessary after passing the finishing line and it is recounted that some of the cars whirl dizzily in making it, some of them making three or four complete revolutions.

The only additional equipment used by the racers are chains to give traction and prevent skidding.

S. A. E. Affiliate Grade Growing

Five new members of the affiliate grade of the Society of Automobile Engineers have been elected. These are the Packard Motor Car Company, Hudson Motor Car Company, Carnegie Steel Company, Standard Welding Company and Royal Equipment Company.

The affiliate grade was established to secure for certain classes of firms and corporations the advantages to be derived from having its employees in contact with the work of the society.

The concerns eligible for this grade of membership are not necessarily automobile manufacturers. Accessory companies and concerns engaged in making material for parts and sundries are also included.

Each concern elected to this grade has the privilege of naming not to exceed six of its employees or personal representatives to attend meetings and to have the advantages of affiliation.

Motor-Propelled Ice Craft Amaze

Racing on the icy surface of the Shrewsbury river in New Jersey in motor-driven flyers is proving an attractive feature of winter sports. F. L. Waters has fitted runners in place of the front wheels of his Ford roadster and with steel-studded treads on the driving wheels skims over the smooth ice up to 60 miles an hour. The automobile has a rival on the river in the shape of a wind-sleigh, propelled by a 12-horsepower Buchet motor. This device has a propeller placed in front, and, while it has not displayed the same degree of fleetness shown by the automobile, it has proved useful in clearing the ice of snow. The wind-sleigh is owned by P. Green and can go 40 miles an hour.

Finances of Savannah Races

SAVANNAH, GA., Feb. 3—The final reports of the November races of the Savannah Automobile Club were made public for the first time today when Secretary Arthur W. Solomon announced that for the two days of racing exactly $54,120.74 was taken in. Of this amount the club cleared only $3,683.94, and to this amount may be added $2,000 which will be turned over to the military of Savannah. The total amount of money derived from all sources for the races was $54,120.74 as follows: Grand prize entries, $10,750; Vanderbilt entries, $5,500; Savannah Challenge entries, $1,300; Tiedeman Trophy entries, $1,150; ticket sale, $29,005; paddock sale, $377; concessions, $3,203; railroad coupons, $2,835.50.

Ford sleigh and wind-sleigh lined up for a race

Bay State's Plethora of Motor Legislation

Nearly a Score of Automobile Measures Now Under Discussion

Abrupt Sound Signals Law May Be Adopted

BOSTON, Feb. 3—An unusual grist of motor bills has been poured into the Bay State legislative hopper this year.

The highway commission has drawn up three bills based upon the recommendations in its annual report. One of these relative to motor trucks on the highway probably will not pass.

However, the amendment to the law allowing the commission's investigators to go outside the state to make inquiries where Massachusetts drivers have figured in accidents is one that will not be opposed and it should go through without difficulty.

Then there is the other measure asking that the appropriations for highways be increased to $1,000,000 annually. That is well worth serious consideration because the usual $500,000 appropriation for construction that has been allowed each year for the past 5 years ends with 1912. So additional revenue is necessary. The bill was favored by motorists at the hearing recently.

If this bill goes through there is a better chance for Mayor Fitzgerald to get some sort of legislation to get money for the parkways. The Mayor has filed two bills, one in the Senate and the other in the House, designed to bring about such results.

The House bill as drawn up seeks to have the fines revert back to the counties. Under the present law all fines go to the state treasury and this robbed cities like Boston of quite a large revenue, for Boston pays for practically all the expenses of Suffolk county.

The other bill has been introduced through the Senate and it seeks to have the motor law amended so that the driveways used by motor vehicles in the metropolitan and Boston park systems shall come under the highway commission appropriation fund. These two bills are before the committee on roads and bridges and will be acted upon together.

There are three bills at least based on the use of signaling devices. The Automobile Legal Association has introduced one and it is making quite a campaign in favor of it among its members. As the organization is large and influential it expects to get a favorable committee report.

This bill is worded so as to compel all motorists to use an abrupt sound sufficiently loud to be heard above the traffic, and it makes it unlawful to make any such sound except as a warning. W. A. Thibodeau, counsel for the association, bases his bill on the fact that it is better to have such a noise made that will cause a person to take notice than to use all sorts of noises as at present.

In a letter sent out by the association it states that accidents are increasing in the cities due to the fact that the people have become used to the ordinary horn and pay no attention to its sound. There is much truth in the contention. The bill is not drawn in the interest of any make of signaling device.

Francis Huturbis, Jr., has put in a bill which seeks to eliminate from the motor law governing sounds the words "harsh and objectionable." He bases his bill upon the fact that it is an easy matter now for police officials to cause an arrest for an alleged sounding of a harsh, objectionable warning. There have been such arrests here.

There is another bill on the subject. It is put in by James D. Tyler and it provides that horns used on motor vehicles be uniform in sound and shall conform in strength and character to a standard established by the highway commission.

The National Association of Automobile Manufacturers has also presented two more bills, one of them seeking to eliminate the 8 miles an hour provision in going around corners and intersecting ways. In place of this the other bill provides that motorists must slow down or even stop when conditions demand it at such spots.

Big Bonds for Operators of Rubberneck Wagons

A bill has also been put in that seeks to increase the penalties for disobeying the motor law. For instance it provides that the fine for violating the law instead of its being $25, for first, $50 for second and $100 for third offenses the judge is allowed to impose a fine of $100 for a first offense if he feels so disposed. Another section changes from 10 days to one year the imprisonment clause and it also wipes out the three conviction sections for revoking a license and places it so that after two convictions in a year, the license shall be revoked.

There is another bill which seeks to jump the fine up to $1,000 and a year's imprisonment where a person figures in an accident and someone is injured. Where a person is killed the fine and imprisonment is placed at $5,000 and three years. A similar bill was up before. Then there is the bill seeking to have cars so geared as to prevent their being operated more than 30 miles an hour. There was a bill of the same sort up at previous sessions and it was killed. As a matter of fact the greater number of accidents happen when cars are going at 10 to 15 miles an hour and such a bill would not lessen them.

There is a bill that provides that applicants for professional chauffeurs' licenses shall have at least 18 months' automobile shop and road experience before being able to apply for a license.

There is a measure that makes an owner of a car criminally and civilly responsible for the accidents that may happen provided such owner is in the car when they happen. Another bill provides that, in an action for damages, proof that the injury was done by a certain vehicle with proof of the number of such motor vehicle shall be prima facie evidence that it was being operated by the owner or his servant. There is also a bill providing that every one who owns, leases or controls an automobile shall file a bond with the highway commission of $5,000 security for judgment obtained against a person for injuries.

According to that bill the highway commission will be a sort of clearing house for accidents. Another bill that seeks to add additional burdens on the commission unnecessarily seeks to have it furnish to the police departments of every city and town the number, name and residence of the owner, horsepower, maker, etc.

Then there is the bill requiring that all applicants for licenses to drive motor cars shall be examined by the highway commission for physical defects. Here the commission is to have a surgeon's department as an adjunct. As a matter of fact, in the application blanks a person must state whether he has any physical defects, and as the statements are sworn to under oath it makes an evasion punishable by law. And where the application states such defects the examiners of the commission look the applicant over, whether he be seeking a private or professional license, so there is no necessity for the legislation.

The bill seeking to make the owners of sight-seeing vehicles file a bond of $5,000 for each passenger carried is up again. It was defeated by the committee a year ago and a like fate will probably await it this year. Then there is the bill put in by the highway commission so that if a person sells his car and seeks a rebate he must make application before September 1 to get it. Under the present law there is no time limit.

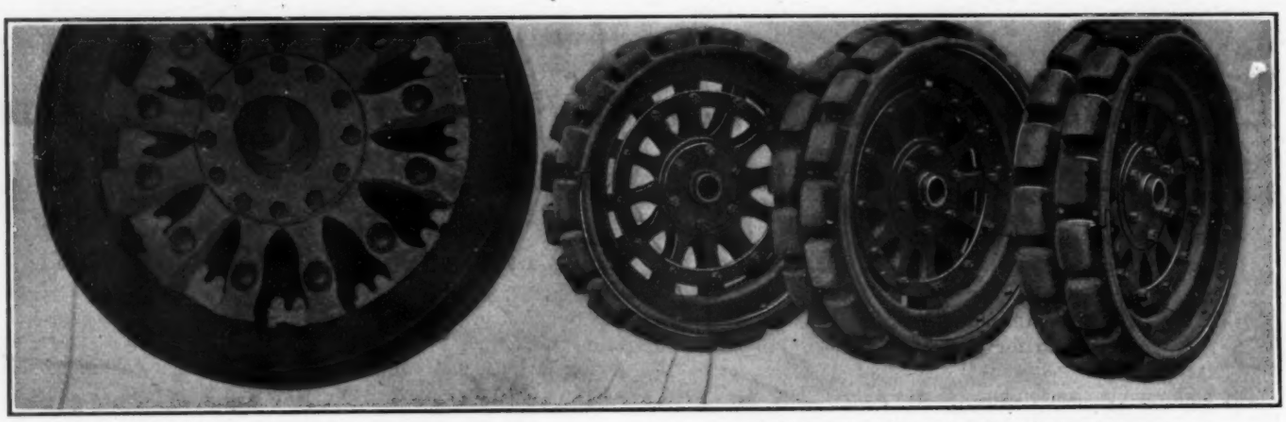


Fig. 1—Aries steel tire, hydraulically forced on rim

Fig. 2—A set of Kelly-Springfield block tires

Numerous Truck Accessories for 1912

Makers Are Realizing the Importance of the Industry

WHILE there is a large number of truck accessories on the market, comparatively few of them were exhibited at the New York shows. If speed-change and steering gears are left out of a detailed consideration, because most of them differ only in the matter of weight and strength from pleasure car types, tires and wheels stand out distinctly as the most important truck accessories shown at the exhibitions.

A perusal of the accompanying short review of the situation will direct the reader's attention to the very noticeable tendency toward using anti-skid treads for trucks. After the advantage of solid tires for heavy work as compared to pneumatics had been demonstrated by practice, experiments were made to adopt, for commercial service, the anti-skid chains used on pleasure cars. The trials along these lines demonstrated the futility of the undertaking, and immediately after this fact was recognized, tire makers worked toward changing the treads of their product in order to obtain a non-skid effect. Treads of varying shape are being used to attain the desired end by practically all the manufacturers.

Illumination is rather rudimentary on commercial vehicles, when compared with pleasure cars. Oil lamps are very much in evidence, and, while acetylene lighting is frequently used for headlights, there are few if any commercials to which electric generators are fitted. Likewise, the speedometer is not part of the stock equipment of the majority of cars; for, all told, the complete equipment idea for commercial cars has not advanced as far as it has in the pleasure vehicle field at this time.

The Jones recorder is a step in a new direction: Control of the driver while on the road. It is illustrative of the trend toward increased efficiency and systematic operation of the delivery business, and no doubt there will soon be a number of recorders operating on the variety of principles used in speedometer practice. Of all the smaller accessories for freight automobiles, the recorder has the greatest chance of being made stock equipment within the near future, providing it proves itself the instrument of precision it is represented to be by its makers.

United States Tire Company, New York—This company's truck tire is solid and is illustrated in section in Fig. 4, representing the dual type of tire, while the single type is seen in Fig. 12. The construction of the tire may be briefly described as follows: It consists of a rubber tread A which is vulcanized upon a strip of hard rubber B, the latter being in turn vulcanized on to an endless dovetailed metal base, which is ring-shaped and has grooves formed in it. By the process of vulcanizing one component upon the other, rubber tread, hard rubber and metal base are made to form an inseparable unit capable of resisting any strain. The advantage of this construction is that the soft rubber nowhere contacts with the metal rim, thus rendering it possible to realize all the resilient effects obtainable from a solid tire. To hold the two tires used in the dual construction in intimate relation, the following members are used: An outside flanged wedge ring F and an inner ring D provide a seat for the two tires proper which are spaced by means of the center wedge ring E. This gives a complete three-piece demountable rim. The construction of the single tire is identical with that of the dual one, save that the use of the center wedge ring is unnecessary. It never becomes necessary to move the inner ring out of its position on either single or dual tires.

Diamond Rubber Company, Akron, O.—The commercial tire made by this company is of solid rubber, and its construction is shown in Fig. 3, using for the purpose the company's dual type. This tire is demountable, the work being done with the exertion of a minimum of effort. In order to hold the tire tightly on the rim a threefold wire layer is placed through the base of the tire which insures a constant close contact between tire and rim and at the same time serves as a reinforcement for the rubber. The tire is spliceless, presenting an endless chain of reinforced rubber held on the wheel under tension. Each tire is guaranteed by the maker to serve for fully 10,000 miles of service.

Firestone Tire & Rubber Company, Akron, O.—This company is in the 1912 market with a variety of products along the solid tire line. There are several sizes of single and double tires, constructed on very similar principles and fixed to a demountable rim by fourteen bolts and nuts. The cross section of the solid tire, which is reinforced by a layer of frictioned fabric is seen in Fig. 8, illustrating a single tire. If the nuts are removed the rim and tire can be made to slide off the wheel with a minimum of effort. In this process the rim, the side flange on which the nuts seat and the split clamping ring come off together, and another rim and tire are easily put in their place. There is no difference in handling double tires, but one set of nuts and bolts being used in the dual equipment.

The tires made specially for heavy trucks have a hard rubber base. The rubber is vulcanized in standard endless rims with-

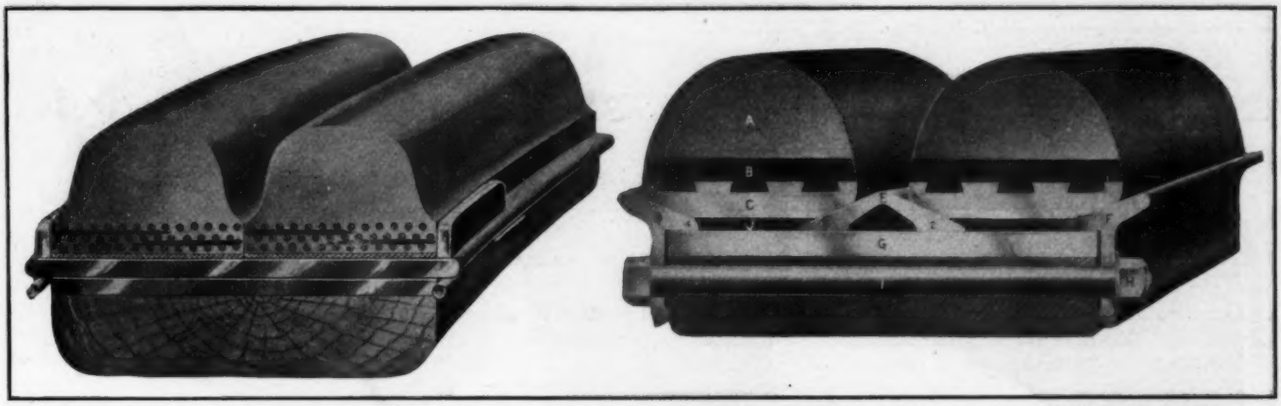


Fig. 3—Diamond dual solid tire with triple wire base

Fig. 4—United States dual demountable solid tire

out a reinforcement of cross bars or side wires. Besides this type a new Firestone block tire is among the products for this year. The blocks are held down by side wires, they having a continuous base without metal plates. There are six different models of this design, including single and double types; they are all designed to permit of a reasonable speed and to protect the mechanism from the shocks encountered in passing over a rough road or pavement.

Consolidated Rubber Tire Company, New York—This company shows the Kelly-Springfield block or sectional tires illustrated in Fig. 2. A number of blocks of solid rubber are arranged along the wheel rim, each block or section being separately fixed to the rim. The distance between the blocks is such that as the wheel rolls under its load the section is compressed forward to its limit of compression, when it almost touches the block in front of it, which subsequently takes up the load. The Kelly-Springfield block tire is made in single and dual style. The company also manufactures an endless tire, or a simple solid rubber tire. It is held to the wheel rim in the following manner, which is made clear by the accompanying cross section. Canvas-covered wires are embedded in the rubber near the wheel band, thereby causing the tire to keep in close and unstretchable contact with the wheel proper. At either side of the tire a side flange is provided which prevents any side play making it impossible for the tire to work loose under any circumstances.

Swinehart Tire & Rubber Company, Akron, O.—A cross-section of this tire is shown in Fig. 7, and it may be seen how the solid rubber tread is bored cylindrically to give a non-skid effect. The base of the tire is of the molded clincher type, with a bead construction similar to that of the clincher pneumatic. To reinforce the rubber of the tire, cross wires are imbedded in the base. They run from side to side and are about 1 1-2 inches apart. The ends of these wires are inclosed by frictional fabric, affording them ample protection. The fabric as well as the base rubber is thereby insured against the effects of moisture which would otherwise find its way to the rubber and cause it to deteriorate. As the tire has no base or core except the cross wires, it is easily applied to the clincher rim. The side flanges shown in the illustration grip the tire base securely, and when the tire is under load, the pressure is transferred to the flanges, thus holding the tire fast on the rim until it is worn out. The rim is quick detachable, being held to the wheel by bolts, so that in changing tires it is not necessary to change the wheels.

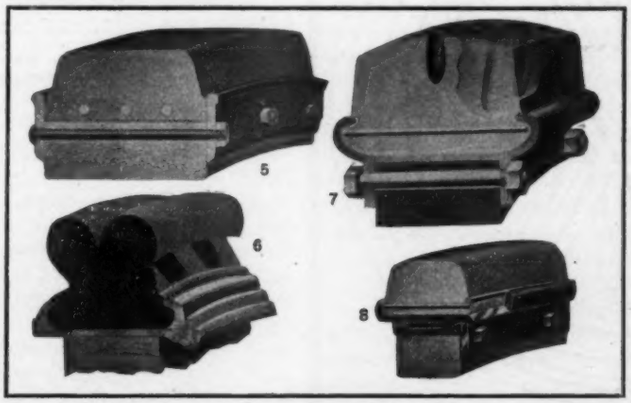


Fig. 5—Swinehart solid tire. Fig. 6—Motz cushion tire. Fig. 7—Swinehart anti-skid solid tire. Fig. 8—Firestone demountable tire

Motz Tire & Rubber Company, Akron, O.—The Motz cushion tire illustrated in Fig. 6, is made of one piece of solid rubber, molded with two treads with a crevice between them. The bead of the rubber is held in a metal flange on either side, which makes the tire easy to change, it being suitable for mounting on any standard or Q. D. clincher rim. Near the bead of the tire a series of peculiarly shaped holes are cut in the rubber; these permit the tire to be compressed in the bead section, thus absorbing side thrusts as well as heavy shocks. Although this type of tire was originally designed for electrics, it has been used on a number of light commercial vehicles.

R. & S. Tire Company, Detroit, Mich.—The R. & S. Tire which is illustrated in cross-section in Fig. 10, consists of a series of solid rubber blocks arranged in lateral contact, thereby giving an effect somewhat similar to the block-tire design. As the wheel travels on, the weight is shifted from one section of the tire to the next, so that no excessive deformation of any one section occurs. To insure better traction, the surface of the tire has shallow H-shaped recesses cut in it; these are compressed under load, and as the weight is taken off them, vacuums are formed which hold the tire section in contact with the ground for the longest possible time. The R. & S. flexible rim, which is recommended for use in conjunction with the R. & S. tire, performs the office of the inner tube in pneumatic tires in that it takes up the shocks encountered on the road, owing to its inherent resiliency. At the same time the R. & S. rim is indestructible, considerable expense in tire cost and upkeep of the truck being saved by its use.

Fisk Rubber Company, Chicopee Falls, Mass.—Realizing the demand for pneumatics on speedy commercial cars and motor-driven fire apparatus, especially where the vehicles have to be propelled over unimproved pavement, this company has constructed a double pneumatic-tire equipment for truck service, comprising two tube-and-casing sets demountably arranged on a wheel, as may be seen by referring to Fig. 11. This illustration shows one tire in place on the wheel, while the other is demounted, and it indicates the small clearance between the two tires, which makes the equipment serve practically as one of the given diameter and section, but of the total width of both tires. It is by this construction that the use of pneumatics for heavy loads is made possible without using

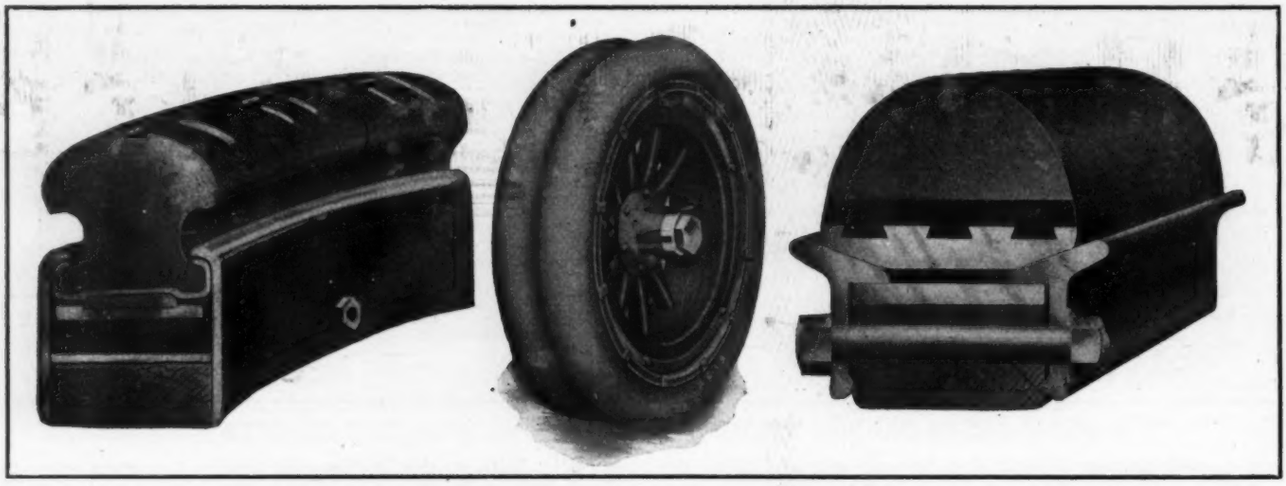


Fig. 10—R. & S. sectional anti-skid tire. Fig. 11—Fisk dual pneumatic tire for high speed commercials. Fig. 12—United States demountable tire

large-diametered tires: It stands to reason that with these tires being used in place of solids, higher speeds can be attained without a corresponding increase in depreciation, which makes this equipment desirable for many types of service in large cities.

Aries Automobile Company, Villeneuve-la-Garenne, France—The Aries truck exhibited at the New Grand Central Palace is shod with a special type of steel tire made by this company. The rear wheels on the 7-ton Aries truck are shod with steel tires 8 inches wide by 1 3-4 inches thick, and constructed with a series of holes cut through them down to the rim. The steel used in these tires must be neither so hard as to be permanently changed by stresses set up in it by constant use, nor so soft as to be unable to withstand the hammering of service without cracking. The Creuzot steel used in Aries tires answers these requirements, but it cannot be welded; so that each tire must be cut of a single billet of steel and forced on the wheel by hydraulic pressure. The steel worked into the tires undergoes quite a complicated process before going into the product, but it needs no care when in place, and the makers say that no steel tire of this type is reported to have worn out.

Peck Wheel Company, Chicago, Ill.—This company exhibited its product at the Palace. The wheel, Fig. 13, consists of a solid rim on which a solid tire is mounted, and a series of spokes. Each spoke is an airtight steel cylinder in which moves a piston located in the center of a specially tempered steel coil spring which has a bearing connection to the rim. If the wheel passes over an obstruction or depression in the road, the rim is forced relatively upward against the weight of the car, so that the air above the pistons in the spoke cylinders is compressed, thereby taking the shock which would otherwise be transmitted to the frame and body of the vehicle. Normally the full weight of the car is carried by the upper half of the rim, representing a solid arch.

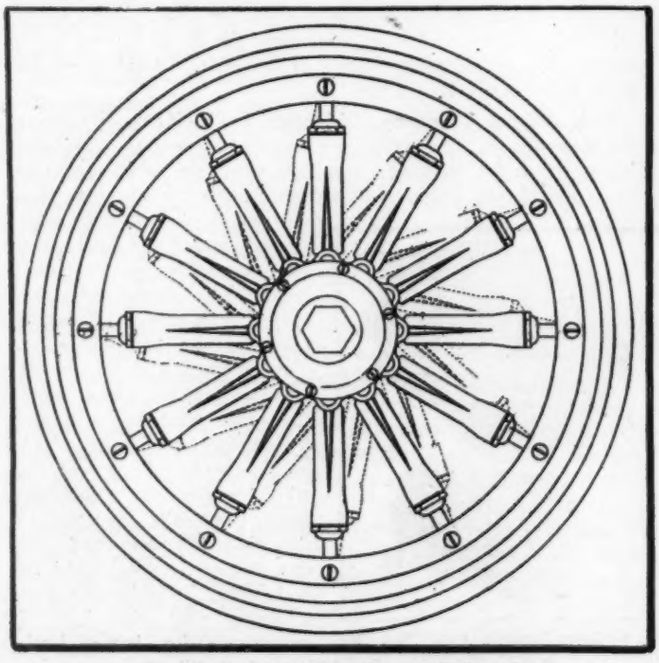


Fig. 13—Peck elastic-spoke, solid-tire wheel

Ross Gear & Tool Company, Lafayette, Ind.—The commercial steering gear shown in Fig. 18 is different in many respects from last year's type, having been adapted to the experiences of the maker as well as to those of the customers. The steering wheels are now made from pressed-steel stampings instead of the old malleable-iron design. The stamping has five spokes of channel section and by means of ten 1-4-inch rivets is held to the hub, which is turned from bar stock. The rim of the steering wheel is of wood, completely enveloping the steel rim of the stamping. The wheels as they are now used weigh only about one-half as much as the malleable-iron wheels. At the same time the appearance has been made more pleasing, while the strength of the wheels has at least been held at the same high standard. Telescoping tubes contain the throttle and spark-control connections, and instead of the ratchets used on levers and sectors there is now a V-shaped slot on the side of the circular part of the sector. In the levers there are fiber plungers held against the sector by springs. Steering arms and

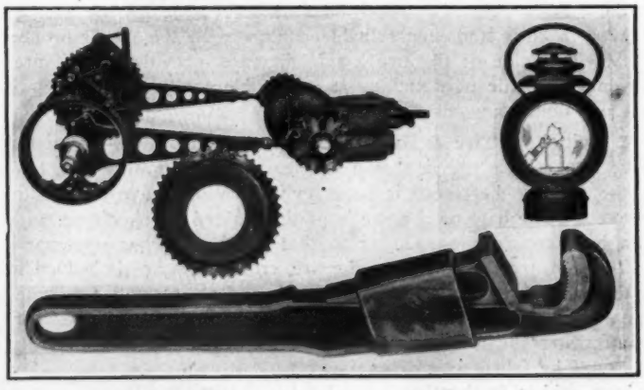


Fig. 14—Sheldon rear axle elements. Fig. 15—Fitzall wrench. Fig. 16—Solar combination lamp for trucks

steel screws in the B. F. and B. B. types of steering gear are heat-treated before being ground.

The Sheldon Axle Company, Wilkes-Barre, Pa., makes a complete line of rear axles for commercial vehicles. The axle tubes are made from the highest grade of seamless steel tubing, cold drawn. The outside diameter of the tubing is 2 1-2 inches and the thickness of the metal is 3-16 inch. The axle shafts are 3 1-2 per cent. nickel steel, heat treated. The working parts of the rear axle are carried at the ends on Empire ball bearings of ample size to carry weight with a 100 per cent. overload factor. The axles are fastened to the sprockets with a taper key and then locked with a large nut and cotter pin. The lock nut and cotter are then covered with a cap nut. The driving sprockets have nineteen teeth in the standard sizes and are made of ample strength ot withstand all strain. Radius rods are fastened to the jackshaft by a swivel collar which is made in two pieces held together by bolts, while the gearset is of the Brown-Lipe type.

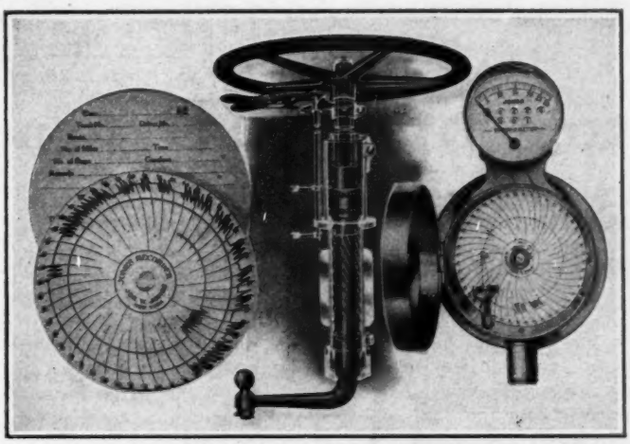


Fig. 17—Chart of Jones recorder. Fig. 18—Ross commercial steering gear. Fig. 19—Jones recorder construction

Cover plates are fastened to the rear of all differential housings so that parts may be readily removed for inspection. The housing itself is malleable.

The McCord Manufacturing Company, Detroit, Mich., has specialized on truck radiators. The radiators, Fig. 20, are of the tubular type and are especially designed to meet the stresses due to the continued vibration met with in truck work. Heavier materials have been used than those which were adapted to pleasure vehicles, with the result that the radiators are now not only sufficiently strong, but have the same radiating qualities which were found in the pleasure vehicle types. Several of the large truck makers have adopted these radiators and they are made in any desired form to suit the specifications of the purchaser. One of the advantageous points claimed by the makers of the McCord radiator for the tubular type is its freedom from a large number of soldered joints and hence the relative reduction in the number of places which are liable to leakage.

Standard Wrench & Tool Company, Providence, R. I.—The Fitzall wrench embodies in its construction the mechanical principle of the wedge. It consists of three parts: the upper jaw which is integral with the main handle bar, the lower jaw which is wedge-shaped and the yoke of the sleeve sliding over the two other parts. Fig. 15 shows the wedge shape of the lower jaw member, which is consequently easily adjusted. The lower jaw member is free to slide on the handle and is locked by pressure on the inclined surface. After it has done the desired work, it is unlocked by simply jarring the wrench.

American Taximeter Company, New York City—This company manufactures the Jones and Popp types of taximeters. The Jones type is circular and on its front side indicates the charges made to the last passenger, being set to zero as his trip is finished. The reverse side shows the owner's record, total mileage and charges therefor, as well as the total extra charge. The Popp meter is similar in operation, but square in shape.

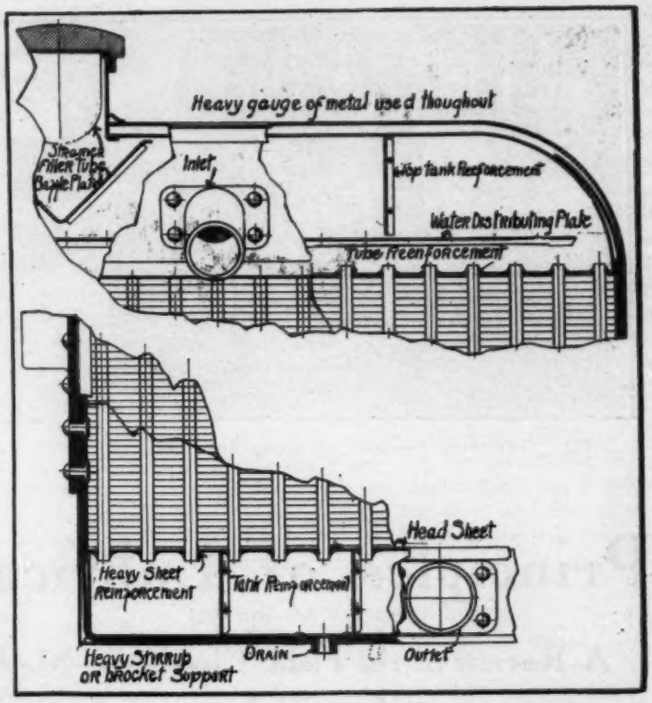


Fig. 20—McCord radiator design for commercial vehicles

Badger Brass Works, Kenosha, Wis.—The exhibit of this company included a Solar combination lamp specially designed for trucks, which is illustrated in Fig. 16. It is made of 18 and 20-gauge brass, which is heavily reinforced, being 15 inches high over bail and having double props 6 1-8 inches between the centers for the fork brackets. The lamp has a large-capacity, flat-bottom oil fount, a 3-8-inch gas tip and a silvered reflector.

Jones Speedometer, New Rochelle, N. Y.—This company has perfected a device called the Jones Recorder, by means of which an automatic complete day's record may be kept of the operation of a commercial or other vehicle. The device consists of a time clock connected to a rotating chart, and cooperating with a recording marker, which is actuated by a flexible shaft driven off the wheel hub similar to the shaft used in speedometers. As Fig. 19 shows, a number of circle periphery sections are drawn on the chart in such a way that if the recording marker or pencil is placed on one point of such a line and is moved about its pivot it follows the circular line. The motion of the flexible shaft is so transformed that it moves the pencil through a given angle for 1-2 mile and back through the same angle for another 1-2 mile, resulting in a diagram like Fig. 17 if the chart is rotated by the clock at the velocity of the small hand. The chart is marked off in one-quarter hours, and the number of 1-2 miles traveled in a given time may be taken as a basis for figuring the speed of the vehicle.

In addition to its reciprocating movement, the pencil is always moved somewhat toward the center of rotation, so that, if the vehicle is at rest, it describes a perfect spiral. This arrangement is provided in order to avoid a confusion of readings differing by twelve hours' time. A daily record sheet is kept under the chart, and is filled in on the morning of each day by the driver.

Recording Speedometer Company, Newark, N. J.—This company makes a speedometer of an entirely different design from the Jones instrument. The Speedograph has the appearance of a square-type taximeter, and the record of the automobile's travel within a given time is made in the following manner. A strip of paper is moved from one roll onto another by clockwork at the rate of 3 inches an hour and it is graded in minutes. The record is made in ink by a pencil reciprocating vertically and making one up and one down stroke for each mile traveled. The pencil is actuated by an odometer mechanism so that it stands still if the car does not travel.

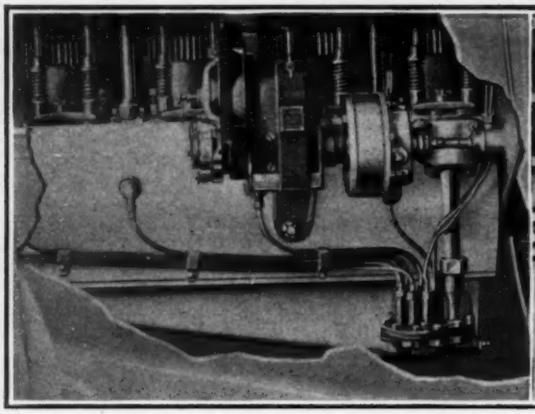


Fig. 1—Showing Franklin oil pump and leads

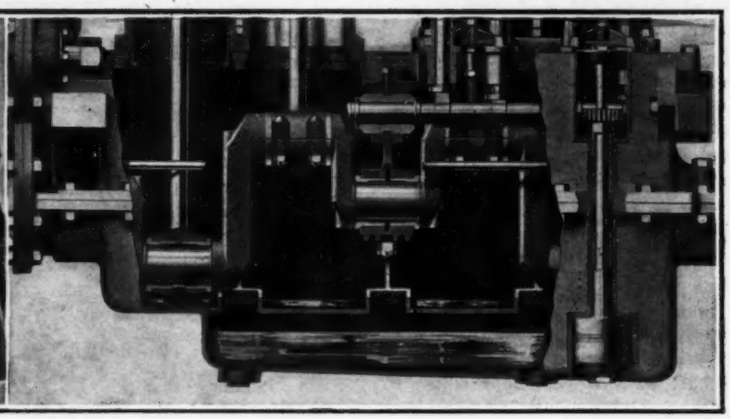


Fig. 2—Falcar crankcase, showing details of splash system

Principles of Lubricating System Design

A Review of the Field, Classifying Methods Employed—What Has Been Done Toward Securing Accessibility—Filtering of Oils

IN ORDER to appreciate the little niceties in the design of a lubricating system for a motor which runs at the speed that the ordinary automobile compels, even when operated at a moderate rate, it will be necessary to review the lubricating as it now stands. The various systems in use need not be considered in detail as they hinge upon two or three general methods which have been accepted as satisfactory for the motor as it now stands. The two general methods which have been subdivided and combined in about every conceivable way in the upward of 400 American automobiles now upon the market, are the splash and non-splash systems.

The splash system may be considered first as it is perhaps the more simple and the type found in the majority of cars. It is especially adapted for the cheaper and medium grades on account of the cheapness and effectiveness and at the same time the little complication in construction which is caused by its installation. On the other hand, the work it does is satisfactory enough for it to be installed on the dearest cars and those in which high-priced material is used for constructive purposes. In the splash system the oil reservoir is almost invariably in the crankcase. The aluminum casting used in the majority of cars is deepened far enough below the bottom of the crank throw that a well having a capacity generally in the neighborhood of 4 quarts is formed in the bottom. The total oil supply may be readily contained in this well and the 4 quarts will generally be enough to last without replenishing for about a month if the car is run an average distance during that time. Figuring on a general average, this oil will last for about 1,000 miles, after which it should not only be renewed, but the crankcase also should be cleaned by flushing with kerosene.

Details of the Splash System

The deepest part of the reservoir is at the rear of the motor as a general rule. The oil drains back to a compartment in which an oil pump is located. The oil pump may be either of the plunger or gear type. It seems to be the general trend that gear pumps be used on account of the natural objection to the ball check valves of the plunger pump which are very apt to stick in their seats at the slightest cause. The pump is separated from the main part of the reservoir by means of a screen through which the oil must pass before it can reach the intake port of the pump. After having been drawn into the pump chamber the oil is very often led through a sight feed on the dash. In this manner the driver obtains a view of all the oil in the system as it passes him on its way to the crankcase, where it is led immediately after passing through the sight feed.

How the oil is treated after it is led back into the upper part of the crankcase is the determining factor of the system which is used. There are many ways in which the oil in the purely splash system may be treated in order to have it perform its work in the desired manner. As a general rule, it may be stated that it is distributed to a system of troughs, of which there is one below each crank throw. The oil in these troughs is maintained at the same level continuously whether the motor be running fast or slow, uphill or down, and for this reason the system is generally known as the constant-level splash. The manner in which this constant level is maintained differs in the various cases where this system is used, but in most cases the rapidity of supply given forth by the pump is taken advantage of and in this manner a level which will be very close to constant will be maintained.

Maintaining the Oil Level

There is one derogatory feature in this case which may be mentioned, and that is the fact that when ascending a steep hill all the oil is apt to flow toward the rear cylinders, and hence the forward cylinders will not receive an adequate supply of oil for the time being. This is not very serious in most parts of the country as the hills are not of sufficient length to cause damage by the insufficient oil supply. In other cases, though, where a long grind up a steep hill is necessary, it will be found that the forward cylinders will overheat and a knock is very apt to develop.

Ingenious methods are made use of in many automobiles of the present day for making the oil level in the troughs independent of the slope at which the machine is traveling. One of the most noteworthy of these methods is that in which a series of sloping troughs arranged in the walls of the crankcase are made use of. The action of the oil in connection with these troughs may be briefly summarized. Each of the troughs is separated from that next to it by means of a wall of metal of such a height that the oil cannot flow from one to another. Con-

necting each trough with that next forward is an oil duct or trough in the wall of the crankcase and running at a severe angle. As the oil is splashed by the connecting-rods it will be thrown into these ducts which are on the wall in the direction of the throw. After having reached the troughs the oil will flow down into the next forward trough where it joins what oil there is there and is again thrown into the sloping duct which carries the oil to the next forward trough. In this manner the oil is constantly being carried from trough to trough until finally the foremost trough is reached. A long channel connects this with the rearmost trough and sloping back at an angle, although the pitch is not so steep in this case as it was in the shorter ducts. It is not necessary that it should be, for in case the machine is descending a hill, the motor speed will be greatly decreased and in many cases the clutch will be thrown out completely. Should the motor be used as a compression brake, the oil required will be readily supplied by the long trough just mentioned. This method has given great success in many makes of cars and there have been no objections offered to it. The oil is kept constantly circulating in this manner and is thus to a certain extent self-cleaning.

Another means which has been used to great advantage in making the oil level in the crankcase altogether independent of the level of the road is that in which the oil is supplied from a stream above the troughs. When this method is used the oil pump is given a rather high capacity; about a gallon of oil per minute at ordinary engine speeds being common. In case there is a force feed, the oil is led directly to the distributing pipe, or if there be no sight feed, the system is self-contained within the crankcase and is, as a matter of fact, more compact and simple than if the sight feed were employed. This pipe runs from one end of the crankcase to the other and is in some cases closed at the end, while in other cases it is allowed to terminate in the timing bearing casing. Above each crank the pipe is drilled.

To Prevent Over-Lubrication

The action of the device may be readily perceived. The oil will flow through the pipe under a pressure which will be so great that through each of the drilled oil ducts there will be a stream of oil spurting into the crankcase. It is evident that the matter of hills will not readily affect a system of this kind, while the amount of oil supplied will vary with engine speed, which is a point to be desired even though it does not take into consideration the work done by the engine at all times rather than the speed at which the motor is running. Since there is no system extant which can be truthfully said to do all of that, however, this method approaches very closely to being as good as may be desired.

It becomes evident that the means for removing the oil must be such that it is drained away as fast as it is supplied, or else there will be an accumulation in the crankcase which will give rise to over-lubrication and hence, smoke. The draining device must do two things. It must, first, be so constructed that the oil is not allowed to accumulate over a certain depth and, secondly, it must be so arranged that the oil is carried away rapidly. The general arrangement utilized for such a purpose is a series of standpipes which are placed in the crankcase so that the oil will start to flow through as soon as the level of the top is reached. At this point it is proper to make a note of the refinements which have been made in the overflow devices in some prominent American cars. There are two which may be noted; the first is that in which the troughs are stationary and the second is that in which they are movable. In the former method the height of the overflow pipes may be altered at will, and in this manner the oil will be allowed to accumulate to a greater or less depth as desired by the operator. In the other case the overflow level remains constant, but the troughs into which the scoops on the connecting rods dip as they turn may be raised or lowered. This latter method has been found to be very successful on a six-cylinder motor of the Knight type. When the troughs are raised, as may be readily done when the motor requires additional oil, the heavy spray of churned oil thrown up into the cylinders will be greatly increased. Since the overflow holes are so designed in this case that they take care of the excess oil as quickly as it rises over the required level the constant level is maintained.

Insuring An Adequate Supply

The action of the oil after it has reached the splash trough is generally understood; still it has often been asked how it is possible for all the bearings within the crankcase to acquire an adequate supply from the simple splash of the ends of the connecting rods into the pools of oil which lie in the trough. There are various means employed even in the cases where the purely splash system is used and there is no direct feed to any bearing. In the primary case the oil is allowed to work its way into the various bearings as the motor is running. This, of course, is the splash in its crudest form. The method generally employed is to allow the oil to not only work its way into such bearings as those which support the crankshaft, but to allow it to flow in by gravity. This is accomplished by shaping the casting so that there is a small pocket just beside the main bearing supporting bridge. The pocket is drilled in such a manner that an oil duct is formed which will carry the oil to about the center of the bearing, from where it may spread in either direction. The course of the oil is very evident. The spray will fall into the pocket and drain through to the bearing, from which it will work its way to the crankcase and join the oil in the troughs or that which is on its way back to the reservoir through the drain pipes.

The action of lubricating the cylinder is very readily understood. The scoop on the bottom of the connecting-rod will throw the oil up into the cylinder for a considerable distance and the piston will then pick it up. The lubricant will be spread by the piston rings so thoroughly that the evenness of the lubrication is rarely, if ever, the source of trouble. It is mathematically

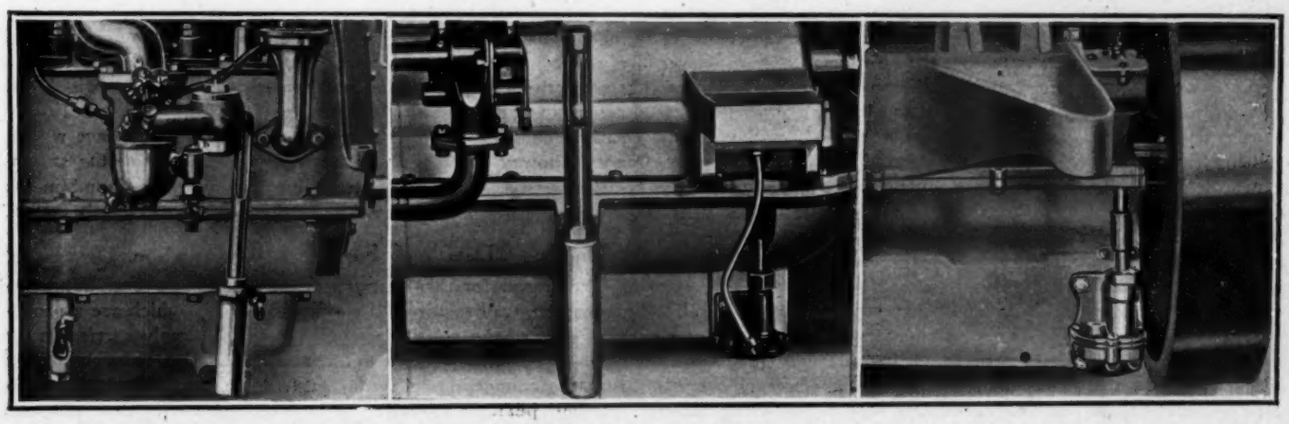


Fig. 3—Ohio oil filler and gauge

Fig. 4—Cutting oil gauge and pump

Fig. 5—Overland oil pump is accessible

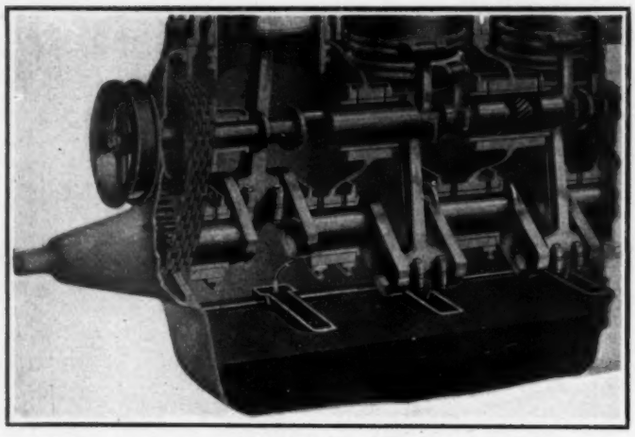


Fig. 6—Sectional view of Columbia-Knight crankcase

impossible to construct a perfect circle. Even the best cylinder is an imperfect circle in section, and the same can be said for the most carefully made piston. Hence in the case of the piston and the cylinder there are two imperfect circles and the contact between the two is never perfect, although very nearly so, owing to the spring in the piston rings which makes up for a large part of the discrepancies in the circles. The free circulation of the oil film about the cylinder is very readily possible owing to these circumstances and the chances of a dry spot in the oil film are on the whole very slight. Too much cylinder lubrication is really the only thing to guard against in the cylinder where the level of the oil in the splash troughs is of correct height. Carbon deposits have no doubt been given far more attention than they merit, and, although it is a fact that some automobilists seem to become suspicious of their motors if they do not give them enough trouble and conclude that it is time to have the carbon removed, it is a fact that if too much lubricant is supplied to the cylinders, especially where the cheaper and less known varieties of oil are used, that carbon deposits will give rise to a great deal of annoyance in the way of knocks, misfires, pre-igniting charges, etc.

Straining the Oil Efficacious

Before dismissing the review of the splash system of lubrication it would be well, perhaps, to take up a matter in which the refinements which have been made by the various concerns and which are a step in distinctly the right direction. This is a matter of thoroughly straining the oil through screens. The course of the oil is from the reservoir, through the pump and then to the various bearings, from which it drains back to the crankcase by passing through the overflow ports. After again reaching the reservoir the oil is passed through the system again. It is very evident that a certain amount of grit and other foreign substances will be picked up by the oil on its course and this will have to be taken out before the oil is again allowed to circulate through the system. Nearly all splash systems are of the circulating type; that is to say, the oil is used over and over again until its lubricating qualities become seriously impaired. A gallon of oil should, roughly, last 1,000 miles before the system is cleansed out and fresh oil substituted for the supply which is in the crankcase. It will be found, however, under certain conditions that the oil will have to be supplemented by adding a slight amount to keep up the correct level where heavy work has been done. The importance of proper screening has been recognized, and there is always at least one screen in the system. In all cases the screen is placed between the reservoir proper and the pump. This is of the greatest importance and is universal practice. Many fit an additional screen at the point at which the overflow of the used oil takes place. This is very praiseworthy in a way, but the trouble is that the screens eventually become stopped up and the whole motor has to be taken down in order to get at them.

Other refinements of various details in the system are many; one of the latest developments in all systems where the crankcase is used as a reservoir is the fitting of large oil-filler holes. The importance of this is readily realized by any one who has attempted to fill the crankcase through some small, elusive breather pipe which is inaccessibly placed between the two blocks of cylinders in a four-cylinder motor with the cylinders cast in pairs. A very good place to fit the oil-filler hole, and one which may be readily reached, is in the crankcase supporting arm. This part of the casting is cored out in such a manner that the oil passes into the crankcase through an opening of large size at the mouth and which is convenient enough to do away with the necessity of employing a funnel. A screen is always placed in the oil-filler hole regardless of what oiling system is used so that the dangers of large pieces of foreign matter entering the reservoir and doing serious damage are hence eliminated. Accessibility of level gauges and other crankcase fittings are of importance as there is a certain element of danger when it is necessary to strike a match to observe the

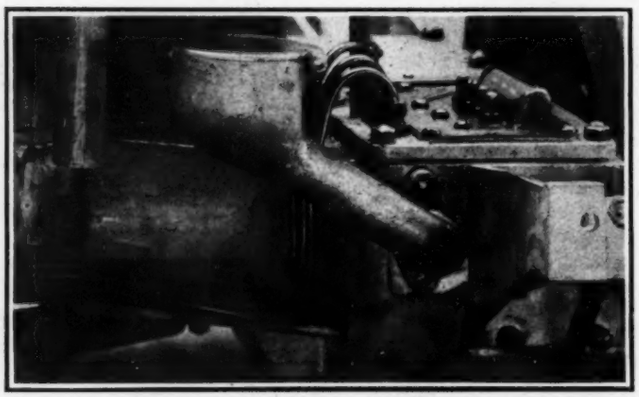


Fig. 7—Elmore mechanical oiler and filler hole

oil-level indicator, for instance. On some of the higher-priced cars the solution of the night problem has been very happily reached by the use of a special electric light which, when switched on, illuminates the gauges so that it is possible to see them clearly on the darkest night. In this connection it may be stated that the wise motorist is always equipped with some form of portable battery flashlight.

The purely force-feed type of lubrication, in which the spray thrown off the end of the connecting rods and the splash of the same into pools of oil are disregarded absolutely as far as lubricating purposes are concerned, finds a much greater field in the foreign field than it does on American cars. This is to a large extent due to conditions which have arisen through peculiar legislation as well as to several other causes which are too complex to attempt to describe here. When this system is employed every bearing in the motor is reached by a separate and independent oil lead which is so designed as to adequately supply that bearing and no more. In the force-feed or non-splash system the oil may or may not be recirculated. When it is, the reservoir will generally be found to be in the crankcase in the same manner as the splash system. One great difference will be noted, however, and that is the fact that other than the stiffening ribs in the casting there will be no partition found in the lower part of the crankcase, as is the case in the splash system.

Details of Force-Feed Lubrication

The reason for this course lies in the fact that there is no supsupporting tray required to carry the troughs, which are a prominent part of the splash system. The oil is simply carried in the basin-like casting and is not permitted to rise to such a level that the connecting-rods can reach down into it and throw the lubricant into the cylinder. It is a fact, however, that, although baffle plates are fitted in the bottoms of the cylinders so that

should the oil be inadvertently raised to such a level that it will be reached by the connecting-rods, racing cars are often given such an extra supply of oil that besides the regular force-feed lubrication a certain amount of oil is thrown up into the cylinders by splash.

The methods by which the oil is distributed to the various bearings in the force-feed systems are various. This is true of either the circulating or non-circulating types. In order that a general idea of the problems involved may be obtained, the most common means of distributing the oil may be briefly described. In a four-cylinder motor with a three-bearing crankshaft there are generally three leads from the pump, one leading to each of these bearings, and very often a fourth, somewhat smaller than the other three, which takes the oil directly to the timing gear case. The oil which is led to the main bearings will lubricate these and also force a large amount of the fluid into the crankshaft, which is hollow and drilled to take the oil as it comes under pressure from the pump. There is a certain amount of centrifugal force to be overcome at the point where the oil flows from the circumference of the shaft to its hollow center, but the pressure on the oil pump readily overcomes this and a liberal quantity flows in. The oil finds its way along the shaft, and when it reaches the cranks flows into these.

Methods of Feeding Oil to Bearings

It may be seen that there will be a certain amount of centrifugal force at these points which will throw the oil into the crankpins under a slight pressure. The crankpins are drilled, as are their bushings, so that the drill holes are concentric and the oil in this way finds a path into the bearing at the lower end of the connecting rods. The oil is distributed from the lower connecting-rod bearing to the upper end of the rod by a combination of oil pump pressure, which will still be left to a certain extent

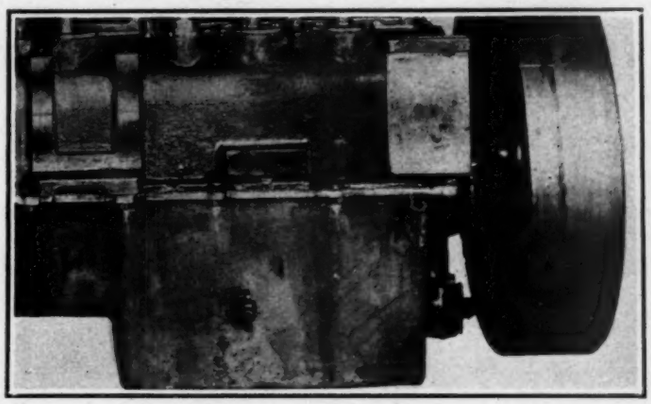


Fig. 8—Oil reservoir on Locomobile Little Six

in the stream of oil, and the centrifugal force which is by far the most important factor in the velocity remaining in the oil. A lead is run from the lower end of the connecting-rod to the upper end, and at this point there is an oil duct in the bearing bushing which resembles to a great extent that found at the lower end. The oil flows into the wristpin, which, in many instances, is left open at either end. In this system the oil is free to flow out at the ends and lubricate the cylinders. There are many variations from this form of oiling and various refinements have been introduced for the purpose of making the supply of oil to the cylinders more copious at the higher speeds. There is a large amount of oil spray thrown from the lower end of the connecting-rod which aids materially in lubricating the cylinders. By increasing the supply of oil given by the pump the oil pressure will cause a greater amount of spray to be thrown off and in this manner the open-ended wristpins form but the secondary oil supply.

The non-circulating forms of lubricating system have to conserve the supply of oil to the utmost in order that the greatest possible efficiency is obtained from the supply of oil. It requires care to secure the same number of miles a gallon from a force-feed, non-circulating system as with the splash. The best part of the non-circulating system is that the oil which reaches the bearings is always fresh and the trouble of cleaning out the system is reduced to a minimum. The oil which accumulates in the bottom of the crankcase must be removed from time to time. This is generally done by means of drain-cocks which are placed in the bottom of the crankcase and often so constructed that they may be all opened at one time. It is a good plan to leave these open while on the road as the oil does no harm in dripping out. While standing in the garage it is a different matter, however, and should there be no drip pan to catch the oil as it falls, a very dirty floor will result.

Mention should be made of the combination system. This method of oiling offers the good points of both systems, and while it cannot be said to be perfect, as there are no perfect oiling systems in use for the automobile motor at the present day, still at the same time the system is so good that it is worthy of much attention. The oil is generally forced to the main bearings, and these are hence well cared for. After having oiled the bearings the excess oil will overflow on either side into the splash troughs and the remainder of the bearings are taken care of in the same manner as described for the splash system. It can be readily seen that such unreliable devices as oil pockets over the main bearings are to a large extent done away with. The oil is supplied rapidly in the same manner as for the force-feed and may be recirculated or not according to the ideas of the designer. There can be no doubt, however, that a greater mileage is obtained when the splash system is used by recirculating the oil.

Lubricant Must Be Supplied Equally

Regardless of what system is used, refinements must insure increasing the lubricant, not only in proportion to the speed of the motor, but according to the work which is being performed. The oil must be supplied to the cylinder at the hottest part of the stroke; that is to say, the top. Another point to consider is that the oil is cleaned and that there is some means for not only keeping it clean, but for thoroughly changing the whole supply. The general method pursued in changing the old oil and replenishing the supply is to drain out the oil from the crankcase and allow the motor to run in a bath of kerosene for about 15 seconds and then to replenish the supply with new oil. This has the good feature that it not only removes the old oil, but the carbon in the cylinders is softened and removed to a considerable extent. On the whole, the requirements for a good oiling system are not many, but they are severe, and the greatest and hardest to accomplish is the feeding of the oil in exact proportion to the work done.

Poppet-valve motors have thus far alone been considered, but now that the rotary and sliding-sleeve-valve motors have

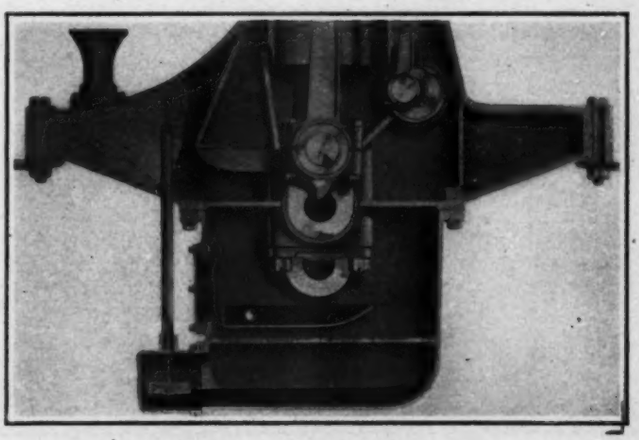


Fig. 9—Section of Columbia Knight crankcase, showing automatic trough

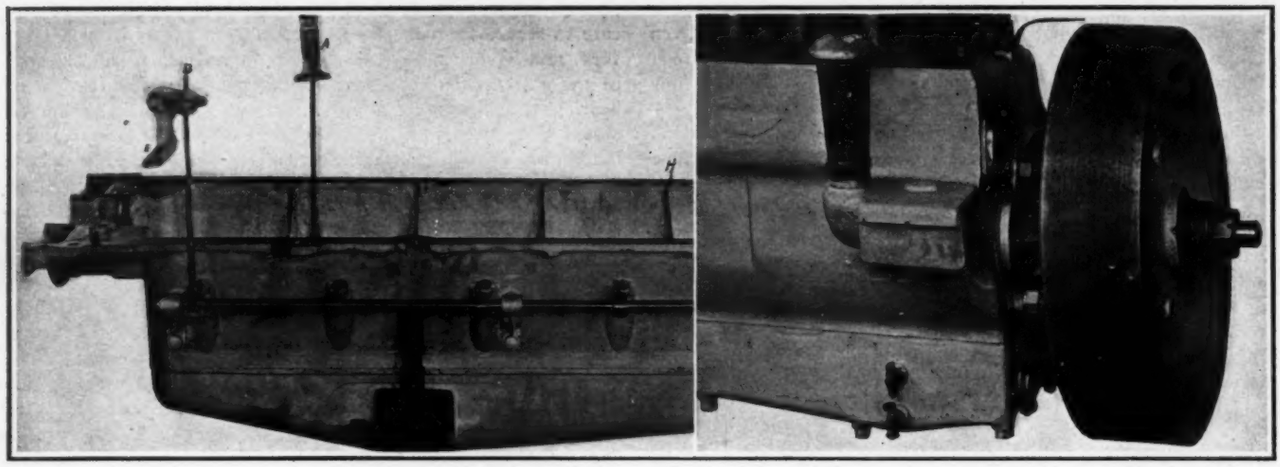


Fig. 10—Kilnekar adjustable overflow—E, bracket; B, adjustment screw; A, level gauge. Fig. 11—Velie oil filler hole on rear left crankcase supporting arm

made themselves a decided factor in the industry and have proved their right to such a place by the evidence given of their ability to stand up at least as well as the poppet forms, it may be well to take up the problems involved in the lubrication of these valves. The Columbia-Knight may be taken as a fair example of the sliding-sleeve-valve type, and a consideration of the method employed in this car will tend to show better than could be done by anything else the care taken to supply an adequate quantity of oil at all speeds. Two views of the system are shown. A longitudinal part section is shown in Fig. 6 while a transverse section is shown through the motor and crankcase in Fig. 9. A view of either section will show that the oil reservoir is in the crankcase and that the system is the force-feed and splash combined, making a very thorough and efficient method of oiling all the parts. The interesting feature of the system is the splash-trough arrangement and this merits detailed consideration.

Splash Troughs Swing on Pivots

It will be noticed in the transverse section that the trough is supported at only one point in its width. This is for the purpose of forming a hinge or pivot about which the device may swing. As the trough is raised or lowered about this point, the supply of oil, which will be taken by the scoop on the bottom of the connecting-rod, will be decreased or increased, according to the direction of motion of the trough. This movement of the trough is automatic and therefore to a great extent independent of the will of the operator. It can be regulated, however, as may be seen in the sectional view, through the cover plate, which is bolted over the part of the crankcase which contains the troughs. At the factory the device which controls the raising and lowering of the troughs is interconnected with the throttle lever so that as the throttle is opened the troughs are raised, thus allowing the connecting-rods to dip into them to a greater depth. This will cause a greater stream of oil to be thrown up into the cylinder and over the sleeves. As the sleeves are working at high temperature a definite quantity of oil must be maintained at all times, and it has been found that the oil mist created by the churning action of the connecting-rod scoops in the splash troughs amply takes care of the entire interior working system of the motor.

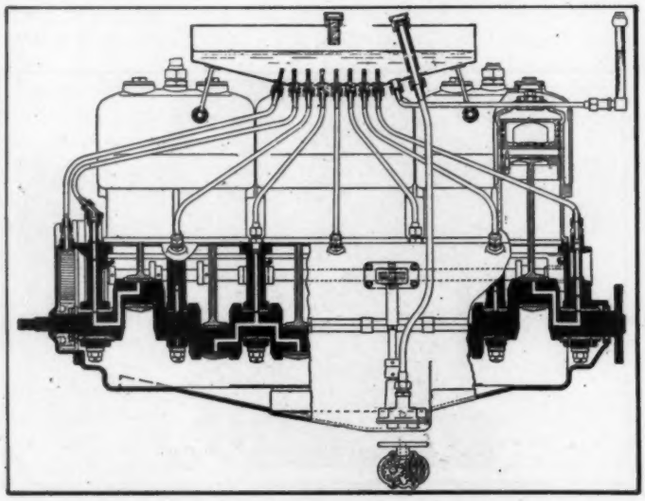


Fig. 12—Lubrication system employed on Pierce-Arrow cars

The method of keeping the troughs constantly full may be seen in the longitudinal section. A pipe lead from the pump takes the oil directly into the trough and keeps it constantly supplied regardless of the inclination of the road on which the car is running. The shape of the troughs will also be noted, as they are rendered also practically independent of the slope of the ground. The overflow may be readily seen in action in the transverse section. This occurs constantly, as the oil is supplied by the pump much faster than it is used at any engine speed. The tray which separates the part of the crankcase containing the troughs from the reservoir is fitted with a very fine-meshed screen and by means of this all the oil which passes back into the reservoir has been thoroughly strained.

Two features which have been mentioned in the general lubricating system description above are very well brought out in the transverse view of the Columbia motor. These are the accessible oil-level gauge and the easily reached oil filler. The gauge is of the float-and-riser type, the ball on the top reaching to a height where it can very readily be seen. The filler hole is placed at the point which has been mentioned before as very desirable from the viewpoint of accessibility. The bell-mouthed shape of the filler hole renders it very easy to pour the oil into the correct spot without the use of a funnel. The oil provision for the main bearings may also be interesting to note in that the reliance of the designer was not put in a single oil pocket in the bearing supporting bridge, but that two are used. These are well shown in the longitudinal section where the drilled holes through the bearing bushing may also be noted.

Rotary Sleeve Lubrication

The lubrication of the rotary-sleeve valves in this type of motor is of the highest importance. In fact, in at least one case the engineer who designed the motor admitted, when questioned, that the gas-tightness of the sleeve was made possible by the oil film, and that it was this alone that prevented a

great loss by leakage and rapid wear. Force feed seems to be almost universally adopted for this type of valve on account of the height of the sleeve above the crankcase and the impossibility of splashing the oil to the point where it would lubricate this sleeve. The oil is subjected to very high temperatures in this form of valve and this is the chief cause of the failure of many attempted types of rotary-valve motors. They have been successfully manufactured in this country and abroad, however, and this has been due to the fact that they were most ingeniously cooled and oiled. The warping of the cylinder under intense heat has often been cited against the rotary-single-sleeve valve, as has also the fact that both the heated exhaust products and the cool incoming mixture have to be handled by the same mechanism and hence difficulties of a rather complex nature are encountered. The cylinder as well as the main and connecting-rod bearings could readily be lubricated by the splash system and this is generally done; the rotating valves, however, require an independent and positive force-feed system in order to have them perform their work in a proper manner. Other types of sliding and rotary-sleeve motors require attention, which will deal specifically with their needs. As a general rule, it will be noted that in the large frictional areas found in rotary and sliding sleeves, grooves or other devices are required in order to spread the oil over the total area so that a dry spot will not give rise to overheat.

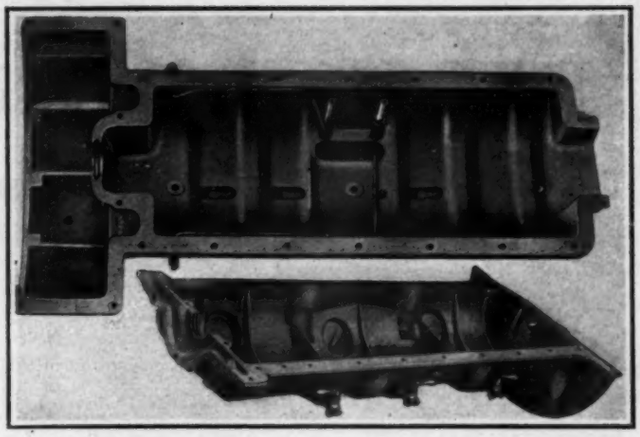


Fig. 13—Two typical splash system crankcases—Abbott and Lozier

Lubricating Special Bearings

Lubrication of special bearings, such as those of the roller and ball type, is a slightly different proposition from that of the ordinary plain cylindrical bearing. The basic difference between bearings of these types and the ordinary bearing is that, while the contact in the latter is of a sliding nature, the special types of bearing have a rolling contact. The great difference in sliding and rolling contact is the fact that instead of an area of contact, as is the case in the plain bearing, the contact lies along a line or is concentrated at a point. The frictional resistance to motion is a factor of the area of contact and the pressure exerted between surfaces; hence, it may be readily seen that in the case of the roller and ball bearings the frictional resistance is markedly decreased. The amount of oil supplied to a body should vary with the friction, and, hence, it may be seen that the lubrication requirements of ball and roller bearings are not as severe as is the case with bearings of the plain type. It is a fact that the most important function of the oil supplied to ball bearings, for instance, is not their lubrication but their protection.

This apparent paradox is explained thus: At the slightest touch of moisture to the unprotected surface a spot of rust will appear. This rust may be so very thin that it is hardly perceptible, or it may accumulate in the form of a small lump. When the bearing is turned so that the weight of the part is carried upon the lump it will be crumbled and there will immediately be a certain amount of the resulting dust lying in the ball cage. This will give rise to rapid wear by cutting the balls as they revolve. If there had been a film of oil over the ball the rust could not have reached the bearing and the result would be that the balls would be kept clean and their life prolonged to a great extent. The lubrication of the bearings is, of course, important, but the fact remains that the maintenance of the bearing depends in large measure upon keeping a protecting film around the ball. In roller bearings there is a greater surface upon which the action of friction can take place than in the case of the ball type, where the hard sphere has such a small amount of compression that the surface upon which it rests is very minute. The spindle upon which the roller rotates must, of course, be lubricated as well as the exterior surface of the roller, and means are always provided for the lubricant finding its way into the inner parts of the bearing. Another reason for the long time which these special forms of bearings may run without a renewal of the oil supply is the fact that the races and cages are so shaped that they contain the oil within themselves, and, hence, when they are once oiled it will be a long time before they become dry. Oil which has been used for some time loses its lubricating properties and it is therefore proper to treat these bearings in the same manner as the other parts of the lubricating system; that is, to flush them out and renew the supply of oil.

The lubrication of other bearings throughout the car which are generally reached by grease cups is of importance, and advances have been made along the line of promoting the accessibility of the cups. In some instances they are placed on the ends of long tubes.

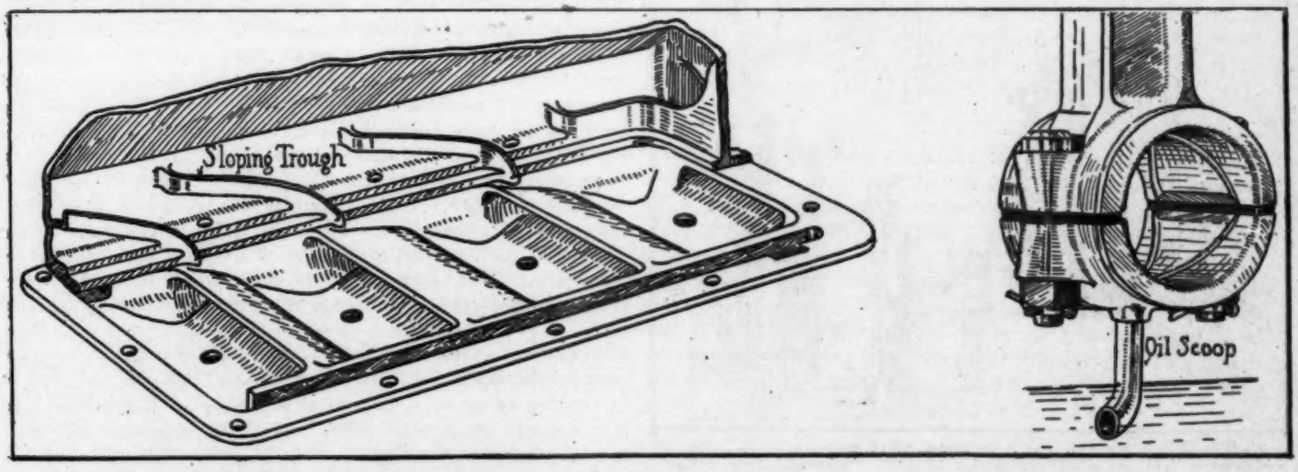


Fig. 14—Cole sloping troughs compensate for changes in road level. Scoop used in same system

Digest of the Leading Foreign Journals

Touching on Crankpin Bearing Lubrication, Double-Jet Carbureter, Twin-Spark Ignition, Electric Spot-Welding, Etc.

OIL to Six-Cylinder Crankpin Bearings—If a six-cylinder motor is cast with the cylinders in two groups of three, the crankshaft has only three bearings, one in the middle and one at each end of the casing. The lubrication of the connecting-rod bearings by pressure through the hollow shaft works very well for those nearest the shaft bearings from which they are fed; in other words, for those numbered 1, 3, 4 and 6, counting from one end, but the connecting-rod bearings 2 and 5 suffer. In the illustration, Fig. 2, representing one-half of a six-cylinder shaft in a Delaunay-Belleville car, a method is indicated for getting sufficient oil to the bearing, 2, of connecting-rod *A*. It consists in connecting it with the adjacent bearings 1 and 3 by means of small curved tubes.—From *La Vie Automobile*, January 6.

Chenard & Walcker System—In the 10-horsepower, four-cylinder Chenard & Walcker motor provision exactly similar in principle to that described above is made for getting oil to the two central crankpin bearings, the object being to obviate the action of centrifugality, which tends to split the oil flow in the middle of the crankarms if reliance is placed in a continuous oil bore with right-angle turns. In the illustration, Fig. 2, *AAA* are the crankpins, *B* is a crankarm and *C* is a hollow auxiliary piece bolted to the latter and forming a circular path for the oil. The ends of the crankshaft and the two crankarms and pins adjoining them are bored centrally, with radial bores in the shaft ends to receive oil from the bearings.—From *Omnia-Locomotion*, January 20.

Noiseless Valve Action—In the Chenard-Walcker 10-horsepower, four-cylinder car of 1912 the camshaft is built into an oiltight compartment running the length of the upper portion of the crankcasing and this compartment is connected with the oil supply in the pit by a coacting-gear pump, driven from a worm on the camshaft acting on a miter pinion at the top of a vertical shaft, the oil passing through a check valve conduit into the compartment at *A*, Fig. 3, while an overflow outlet is providel at *B*. Camshaft *O* is thus constantly submerged. To obviate all striking of the cams against the valve stems *E*, and at the same time avoiding the use of rollers, the cams are kept in constant touch with the stems by means of arms *C* to which are secured weak-leaf springs *D*. The action of the cam easily forces the arm *C* and the spring *D* together when the valve-stem is raised, but, as there is continuous contact, there is no noise, and, as the valve spring is many times stronger than the auxiliary spring, there is no intereference with the proper valve action.—From *Omnia*, January 20, and *La Vie Automobile*, January 6.

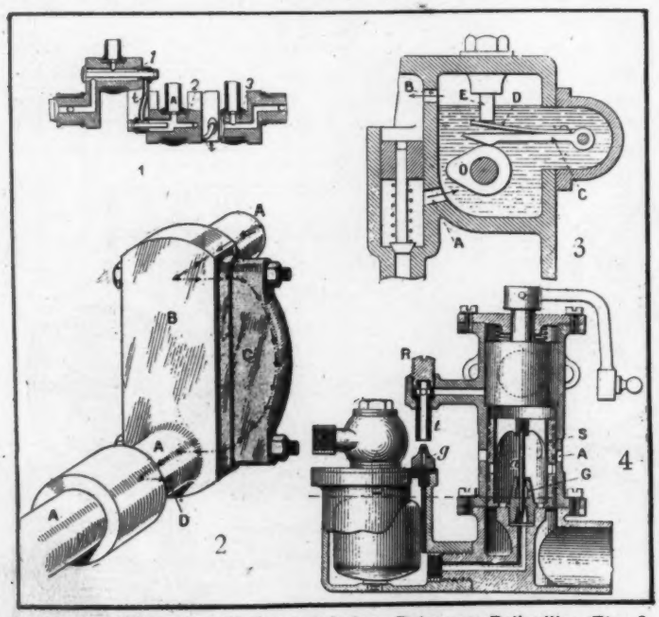


Fig. 1—Oiling six-cylinder crankpins, Delaunay-Belleville. Fig. 2—Chenard-Walcker crankpin oiling. Fig. 3—Noiseless valve action. Fig. 4—Small double-jet carbureter

Small Double-Jet Carbureter—The carbureter in the 10-horsepower, four-cylinder Chenard-Walcker car for 1912 is of a construction which has now been tried out in these cars by the public for more than one year. Its design is shown in Fig. 4. The principal features are: A rotary sleeve valve controlling the gas exit; a free piston *S* which is raised by the suction in the cylinder and uncovers the air openings *A* at the same time as a needle plunger, which is securel to it, is drawn out of the jet *G*, opening the way for the gasoline more or less, and a special jet *g* for very small power development. The latter communicates directly with the float chamber and is released only when the needle completely blocks the feed from the main jet. The slow-speed jet is subject to adjustment by means of the screw plug *R*, which regulates the distance between the jet and the tube *t*. Wear of the piston *S* seems to be obviated by means of elastic packing rings.—From *Omnia-Locomotion*, January 20.

Effects of Twin Spark Ignition—Among the reasons offered for the growing popularity of the twin spark and the magnetos which secure this form of ignition the showing of increased power which has been made in practice as well as in laboratories is not the only one. While a single spark calls for an advancement of the moment of ignition corresponding to an arc of 30 degrees at the maximum power of the motor, the twin spark, by reducing the time required for the inflammation of the whole explosive mixture, reduces the maximum advancement to 15 degrees, as demonstrated in the same tests by which the increased power was shown. And throughout the range of power development the same proportion holds good, which means that with twin spark ignition the danger of so-called backfiring when a motor is started—meaning the reversing of the motor by which the starting crank is sometimes thrown back violently against the arm of the starter—is much reduced, even if it has been forgotten to retard the spark. Under the supposition of hand control, the spark will, with the twin spark system, be at most 15 degrees advanced. The piston will be near dead center, and the number of revolutions at which the magneto will give sparks capable of igniting the mixture may easily be made so high that the momentum of the flywheel at this speed, and in

this position of the piston, will render a reversal of the motor impossible. The reduction of the advancement also benefits the functioning of the motor in another way. The nearer the connecting-rod is brought to its dead center position at the moment of firing the greater is the compression of the mixture at that moment, and the more certain is therefore the ignition. Fouling and short-circuiting at the spark plug terminals become a more remote possibility by the better condition of the mixture, and because the chance of fouling two plugs is less than one-half of the chance of fouling one. For ordinary driving any spark-timing control by hand should be practically superfluous when the maximum power is anyway obtained at an advancement of 15 deg. instead of 30 deg. —From comment on the Brussels show by C. Faroux in *L'Auto* of January 19.

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Electric Spot-Welding—For several years the system of joining one piece of sheet steel to another by welding them together in spots has been in use in some shops, especially in England, the spots being selected about as far apart as the rivets and the work under these conditions being more rapid than riveting. The method has been used for assembling automobile frames. The Allgemeine Elektricitäts Gesellschaft, of Berlin, has placed in the market a machine intended for this work, which is shown in front and side views in the accompanying illustration, Fig. 5. The principle of the work is that the two sheets are placed one on top of the other with the spots to be fused together exactly between two electrodes, of which the upper one is pointed and capable of a small up-and-down movement, and that the electric current is interrupted whenever the upper electrode is raised. When coming down again it serves to distribute the fused metal evenly. The two plates are held together under some pressure during the operation. The reciprocal movement of the electrode can be made automatic, so that the workman has nothing to do but to move the sheets to a new position when a new spot is to be welded. The machine shown is of this type. The lower electrode, corresponding to the anvil piece of a riveting machine, is located upon the end of a horizontal arm, while the upper terminal *d*, corresponding to the triphammer in riveting, is mounted upon a carriage vertically movable between the slides *c*. This regular movement is effected by means of the shaft *b*, actuated by the crank arm *a*, which in turn receives its oscillating movement from an electric motor or from any other transmission mechanism. The machine is started by means of the pedal *e*, which, through rod *f* and a clutch, controls the motor mechanism of shaft *b* and of the interrupter *g*, acting on the primary current of a transformer. The latter is generally located in the base of the machine and consists of a primary, high-tension spool and a secondary low-tension winding formed in most cases of a single turn of a copper wire, the ends of which are connected directly to the fixed and movable terminals respectively.—From *Le Génie Civil*, January 6.

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Black Lacquer for Metals—In order to have a quick-drying lacquer—as distinguished from a backed-on enamel or paint—adhere permanently to a metallic surface, as now often required in the manufacture of automobile accessories, the metal surface must be so prepared that there is formed a porous coating inseparable from the metal itself, to which coating the lacquer may adhere. To be sure, certain oil varnishes and turpentine compounded with copal lac, linseed oil and rubber powder will also adhere to smooth metal surfaces, but they demand a long drying period and their tough fibrous structure renders it difficult to grind or buff them; they are not suitable for hurried production. The Zentralblatt für Optik und Mechanik offers an empirical method which may be of value.

The porous coating referred to must be built up chemically. After the metal has been polished, grease is removed by benzine or alcohol, and the article must not be touched with the

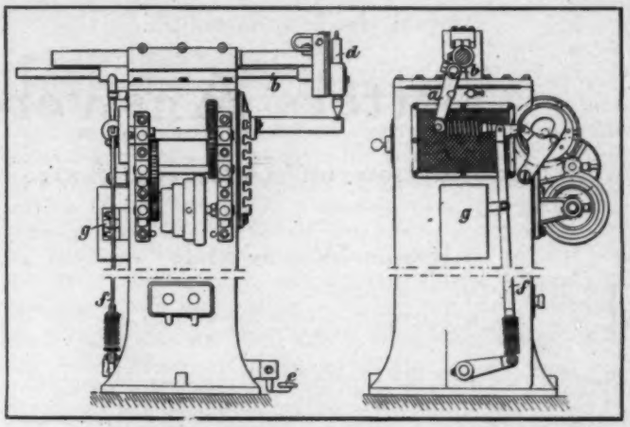

Fig. 5—Front and side views of German spot-welding machine

naked fingers after that. The etching mixture to be used to form the desired coating is prepared with 30 parts of ordinary commercial nitric acid, 40 parts of 60 per cent. alcohol, 10 parts of a thick solution of gum arabic and 20 parts of soft water. This is mixed in a glass bottle together with crushed porcelain (to promote uniformity), and the mixture, which must be thick enough to neither run nor drip, is spread sparingly over the metal with a brush. If the first coating does not seem sufficient it should be dried and then another one may be put on top of it. By heating the mixture or the metal, the etching is accelerated. The formed film becomes very firm by exposure to the atmosphere or an air blast after it is dry. After complete hardening the film is smoothed with agate polish and is now ready for lacquering. On brass the film has a greenish, felt-like appearance, while zinc shows a whitish coating.

Any ordinary black lacquer or varnish may now be applied in the usual manner, and many grades of these which are widely obtainable in trade are quite satisfactory. The matter stands differently if an acid-proof coating is wanted and one which may be polished either matt or brilliant. Such an acid-proof black lacquer may be prepared as follows: (1) Copal lac, 30 parts, is stirred, coarsely powdered, into 100 parts of heated turpentine, fine glass splinters being mixed in to promote the solution of the lac and avoid lumps. (2) A solution as thick as possible of Dead Sea asphaltum in turpentine is produced under heat. (3) Powdered ebonite or hard rubber, together with finely powdered bonemeal, is dissolved in a mixture of turpentine and benzol under much higher heat; and the mixture must be stirred vigorously, with broken glass or porcelain, to obviate lumps.

With 10 parts of the first solution, 20 parts of the second and also 20 parts of the third, the desired lacquer is now produced by mixing the three, and it may be thinned with alcohol or benzol to make it easier to handle in the brush. It must not be put on too thick, as then ridges are likely to form in the drying. It is dried at a temperature of 50 to 60 degrees Centigrade. —From *Metall-Technik*, December 16.

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Catalogue of French Cars—"L'Officiel des Catalogues 1912" is the name of a compilation of the abbreviated specifications and prices of nearly all automobiles made in France, as well as many Belgian, German, English, Italian and American automobiles for which there are established agencies in France. It is published by Bibliothèque Omnia at 20 Rue Duret, Paris, and sent postpaid for 1.75 francs (35 cents). It gives the following data as furnished to the publishers by the manufacturers themselves: Names of models, number of cylinders, arrangement of cylinders, power, bore, stroke, motor speed, style of clutch, number of gear speeds, dimensions of tires, track width, wheelbase, weight of the chassis or the complete vehicle, ignition system, style of drive, prices of chassis or complete vehicle with and without tires.

Letters Answered and Discussed

Information on Defective Axle Lubrication, Steaming Radiators, Etc.

"Reason Wid de Mule"

EDITOR THE AUTOMOBILE:

[3,016]—I sympathize with READER who has had "defective lubrication" of rear axle. His case simply shows how much depends upon the thought of the operator of the car. READER had better first take rear axle housing out and see if it has an oil hole in it. Perhaps when the rollers became jammed they crowded the housing out of place so the oil holes did not register. The oil cup is there, possibly a grease hole lingers near. On steamships and in factories we would hardly blame the manufacturer for a hot box. We try to discover trouble before it gets serious; a little squeak, a little heat, and we get busy. How sensitive our ears become to any unusual noise at the rear of the car when driving! A locomotive engineer was once much startled by hearing a little clicking sound until he saw it was the fireman straightening a wire on the tender, for his pipe.

So when READER had difficulty in making his grease cup screw down he should have investigated, for perchance it were dirt or a steel cutting in the grease passage.

A wire would measure the depth of the grease hole; he could have felt for the rollers, and, not finding them, known that there was no grease hole; he could have unscrewed the grease cup and looked in the supposed hole to see if rollers or balls had a smooth surface and were turning. One can feed a horse oats and say he has done his part, but the true horseman tells by the appearance of the horse whether he has been treated right.

My method of greasing a rear axle is to use some thick oil in the differential, say, some 600 degree steam engine cylinder oil. The advantage of oil is that it can be drained out from time to time on a warm day and the housing can be rinsed out with cheap coal oil, thus removing most of the particles of steel-cutting without garage expense. Next fill pretty nearly up to the underside of axle with fresh oil and then use the grease cups on outer end of axle to keep dust forced out of bearing. The excess grease should be scraped off from the axle and not allowed to spread over the brake drums. Where the brake drum is enclosed by a stationary flange on the axle it will not be necessary to use so much grease at the ends, but make same go in the bearing. I can judge when I have enough by the internal brakes failing to hold so well. See that the rear axle revolves easily when jacked up and that the whole car rolls readily on a smooth floor.

Baldwin, La. JOHN PAUL BALDWIN.

What Is "Cycle"?

Editor THE AUTOMOBILE:

[3,017]—In automobile parlance what does cycle mean in its application to the motor? What is meant by one-cycle, by two-cycle, by four-cycle, etc.?

(2) What relation is cycle between the stroke of the piston and the revolution of the crankshaft, and does it mean the upward or downward stroke or both?

F. G. KAMPS, JR.

Indianapolis, Ind.

To be brief, the word cycle as used in automobile practice refers to the number of strokes per explosion in any one combustion chamber. It is thus impossible to have a one-cycle motor.

(2) There are two strokes to each revolution, an up-stroke and a down-stroke.

Cooling Water Boils

Editor THE AUTOMOBILE:

[3,018]—I have a four-cylinder touring car cooled by water. I have a large amount of trouble with the cooling system on account of the water boiling when the car is running at a speed of from 15 to 20 miles an hour. Would you kindly tell me if this will damage the motor and what is the probable cause of the trouble? SUBSCRIBER.

Ringsted, Iowa.

When the radiator steams it is usually due to one of the following causes: Poor lubrication (indicated by groans from the motor), not enough water in the system, leak in water system, mixture too rich, crack in the cylinder, circulation system clogged (examine hose connections), slipping fan belt and traveling too long with retarded spark. It is quite possible that the slipping fan belt is the cause of trouble, although it might be any one of the others. If the mixture is too rich at high speeds the carbureter needs adjustment, but do not, by any means, attempt to adjust the carbureter unless you are sure that all the other sources of trouble have been exhausted. Running the motor with a steaming radiator is very bad for it.

Wants Valve Timing Gauge

Editor THE AUTOMOBILE:

[3,019]—I send herewith the following clipping which I took from one of our daily papers.

> **Look After the Valves.**
>
> Be sure your valves are set right to secure the maximum efficiency from the motor. If the motor is taken down for any reason one cannot be too careful in reassembling same to get the correct setting of both valves and magneto. Every motorist should own a valve timing gauge and know how to time the motor and valves, if only for his own benefit.

I have tried all the supply stores and garages in the city but they never heard of such a device. Do you know of any such? If so kindly state where it is made as it looks good to me.

W. K. S.

Hartford, Conn.

The only device we can suggest in this case is the time-honored flywheel and engine frame marks which register at the opening and closing of the valves.

Troubled by Noise

Editor THE AUTOMOBILE:

[3,020]—I have a two-cylinder Reo automobile and would like to know if there is a way that I could silence the noise made by the exhaust. I am contemplating putting on a new muffler, but would like to have advice from you before I go to that expense.

W. E. WESTHOFF.

La Grange, Mo.

Without seeing the car it is impossible to say, but it looks as if the old muffler is defective and should be replaced.

To Blacken Lamps

Editor THE AUTOMOBILE:

[3,021]—Having seen many requests for a blackening paint for brass lamps from time to time under "Letters Answered and Discussed," I submit the two formulas below to readers of THE AUTOMOBILE. I have used both and must say they do all that is required of them:

(1) Fuse 3 pounds of Egyptian asphaltum, and when liquid add 1 gallon of pure turpentine in which has been put 1-2 pound best pale shellac, previously dissolved in a little alcohol. Keep in can or bottle.

(2) Dissolve 1-2 pound best pale shellac in 1 gallon pure alcohol. Agitate slowly while dissolving. Let stand, filter and bottle. Color by adding sufficient lampblack to give the desired tint. May be made up as required.

Both may be applied either by dipping or by running on with a fine camel's-hair brush.

The first mixture gives the best results for heavy work.

E. H. PARIZOT.

Richmond Hills, New York City.

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Acetone as a Decarbonizer

Editor THE AUTOMOBILE:

[3,022]—As a subscriber to your valued magazine, I take the liberty of asking advice relative to using a mixture of kerosene and acetone as a decarbonizer.

I have been using the former alone with a great deal of success, but a friend of mine told me that by mixing the two (two parts kerosene, one part acetone) I would receive much better results. He advises removing a spark-plug from each cylinder, pouring some of the mixture in the first cylinder, immediately replacing the plug, treating the second, third, etc., in the same way and then turn the engine over once by hand. Remove the spark plugs again repeating the dose, and, replacing the plugs, let stand over night and in the morning run the engine for a few minutes to remove the carbon dislodged by the action of the mixture.

Do you recommend the above, if so, what would you say about the correct amount for each cylinder, and, in your opinion, would this combination harm the engine in any way?

Oregon City, Ore. W. R. L.

This combination should work very well, as the acetone would attack the organic binding materials of the carbon. A cupful to each cylinder would be about right and no damage should be done to the motor by its use. Acetone is a well-known solvent for organic substances only. Carbon is inorganic and hence requires the kerosene to soften it.

A Gasoline Tank Repair

Editor THE AUTOMOBILE:

[3,023]—Inasmuch as my fellow subscribers are writing you, telling of their trials and tribulations concerning their motors, I now take the liberty to offer an experience in the hopes that some other motorist may be saved the same trouble.

On returning from a reliability run which was held under the auspices of the Forest Hill Automobile Club, my motor suddenly stopped and, after some vicious and most tiresome cranking, absolutely refused to start again. My first thought was absence of gasoline in the tank but after looking I found that such was not the case. My next thought was ignition trouble; but, after making a thorough examination of the wiring, I found it to be perfect.

Finding the ignition to be faultless, I concluded that the gasoline supply line had a leak between the tank and the carbureter.

Having previously examined the manifold for sand or air holes, I started to go over the supply line, as shown in Fig. 1.

As soon as I got under the car, I noticed a very bad leak C, coming from the beginning of the pipe line B, the pet-cock being right under the starting point of the line.

Not having the necessary union to make the repair that is shown in Figs. 2 and 3, I plugged up the old union as shown in Fig. 4, plugging it with wood as shown at C. My next move was to remove the rubber tubing from one of the gas lamps and putting one end on the broken gasoline pipe and the other to the bottom of the pet-cock as shown at A, Fig. 4. I sincerely hope this will prove of interest to my fellow subscribers to THE AUTOMOBILE.

J. B. HURD.

Newark, N. J.

—

Another Tank Leak

Editor THE AUTOMOBILE:

[3,024]—I notice in your issue of January 4 the gasoline tank repair of Mr. Gleason Wood and possibly my experience is worth mentioning. One Sunday, 10 miles from any house, I found the tank leaking badly round a rivet head on the bottom, from which the solder had broken away. It was checked for the moment by a lump of grease from one of the cups. I had no torch, soldering iron or solder, and the solution of the difficulty was a length of soft iron wire passed round the tank twisted up fairly tight and a flat piece of wood covered with leather (from a glove cut up) forced in between the wire and the defective spot; the wire was then twisted up tight with a large wire nail and there was no leakage during the 150-mile run following.

F. A. A.

Winnipeg, Man., Canada.

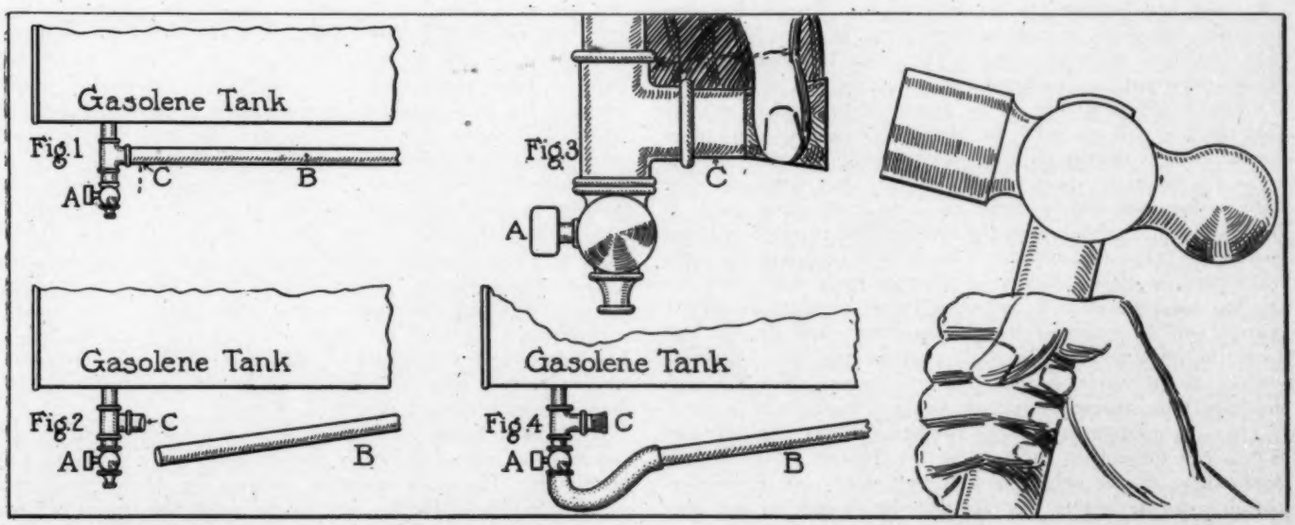


Fig. 1—Tank, showing point of leakage. Fig. 2—Where pipe was cut. Fig. 3—Plugging end of pipe. Fig. 4—How the finished job appeared

Pointers for Repairmen and Drivers

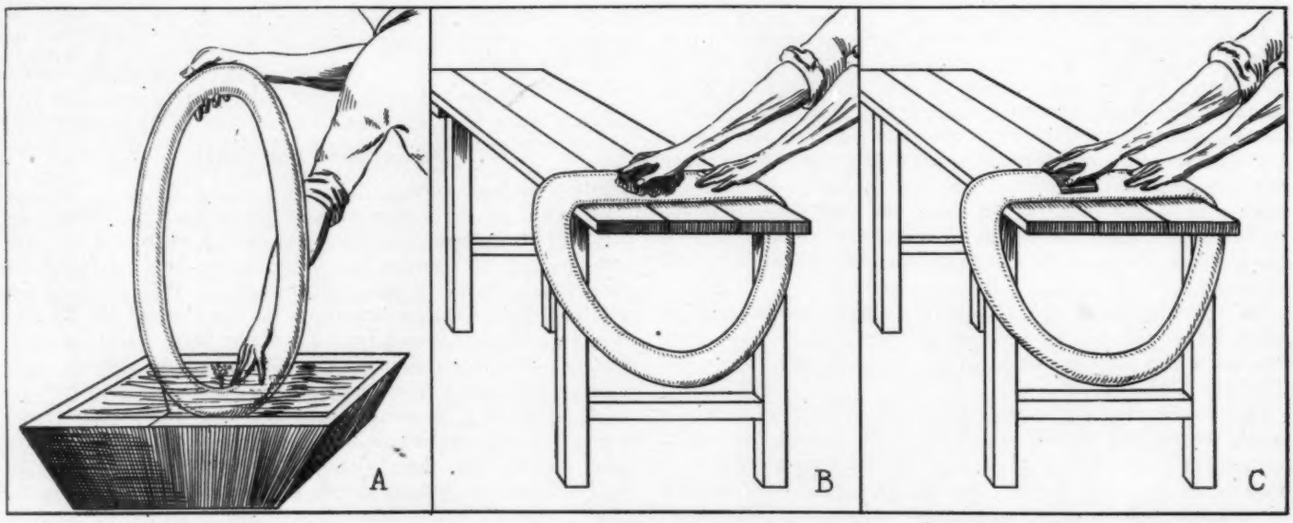
Repairing Inner Tubes; Managing Sparking; Noisy Differentials

TEMPORARY REPAIR OF INNER TUBE.—Vulcanizing is the only sure way of curing a leak in rubber, whether it be through the exterior casing or through the inner tube. Every man has not the time, however, to experiment with a vulcanizing outfit and, although there are several on the market which possess the merit of simplicity, these have not become sufficiently well known to be articles of everyday use in the private garage. The patch method of curing leaks is temporarily satisfactory in cases where the leak is small. It is described here for the benefit of those who have not been used to making this repair or who have not been successful at it because they have overlooked some apparently unimportant detail which is vital to the success of the operation.

The first step in repairing a slow leak in an inner tube is to determine the exact position of the leak. This is very readily done by the time-honored method of placing the tube in a basin of water and looking for the spot whence the bubbles issue. In order that there be bubbles there must be some air in the tube and there must be a leak. The latter is generally there before the repair is attempted, while the air can be placed in the tube by a few strokes of the pump. If the leak is so large that the tire will not hold the air long enough to place it in the water, it is usually the case that the leak is evident enough to readily detect its exact location without that operation. The light rubber tube will be found to be buoyant when placed in the bath, and for this reason the hand will be required in order to force it below the surface. This is very necessary, as many leaks have the elusive faculty of being perfectly tight when the tire has no strain upon it, but when forced to carry weight the opening will be expanded to such an extent that air will leak from the opening. The hand, in pressing the tube below the surface of the water, is free to exert pressure upon it in any direction, thus causing the leak to open and manifest its location.

After the position of the leak has been located, the next step is to clean the rubber surrounding it. This is of the highest importance; it can safely be said that nearly all futile tire-patching can be laid to the fact that the rubber has not been thoroughly cleaned. A little gasoline or naphtha on a piece of waste will readily remove the soapstone and grease which are apt to be upon the surface of the tire and which are absolutely fatal to the binding effect of the rubber cement. As soon as the dirt has been carefully removed the surface of the tire should be sandpapered to give a good-holding, clean surface. The gasoline-wetted waste should then be called into use again and all surplus material sponged from the surface. The patch is given the same treatment, being sandpapered and sponged off with the naphtha or gasoline. Now that the surfaces have been put into the proper condition, the cement is ready to be applied.

The cement, regardless of what variety it may be, should be allowed to become almost dry before the patch is applied to the leak. The cement should be applied to both the patch and to the tire itself. When it has reached the state of dryness at which it is the most sticky the patch should be applied to the tire and held there tightly until it has firmly adhered in all spots and not merely at the edges or in the center. It is quite a knack to be able to have the edges of the patch as firmly fastened down as the center, but this is very essential to good work, or the patch is apt to tear off again. When it has been firmly held down for a few minutes so that adherence is insured, a little powdered soapstone is scattered over the tire in the neighborhood of the spot in which the repair has been made in order to destroy the sticky effects of any of the paste which may be near the edge of the patch. A piece of wood which has been given a very good flat surface is laid over the tire and a clamp placed over it. This will firmly hold the patch in place and should be left there until it has firmly dried. If the repair is made upon the road, the patch will have to be held by hand, in which case it will not be so reliable as when made at home, where plenty of time can be taken. The soapstone will prevent the tire from sticking to the block of wood.



First locate the leak — Clean tube with gasoline — Sandpaper spot to be patched

The accompanying illustrations show the operation in detail and serve to bring out clearly the ideas expressed in the above description. The most important steps in the whole operatiton are the cleaning of the tire and the drying of the cement before applying the patch. A bench is the best place to do this work,

for it can then be kept clean and the clamp may be used to great advantage on the flat surface.

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Managing the Spark—How the new driver is to know when he is getting the most from his motor at a given throttle position is very hard to determine. The automatic advance has been advocated to a great extent abroad, and at the present time the American magneto manufacturers are not only giving the matter their most serious attention, but are producing magnetos with automatic spark advance in ever-increasing numbers. It is a conceded fact that the expert driver can get more from his car when he is allowed to govern his spark than can be procured by automatic spark advance, but among the new drivers there are a vast number who consider themselves expert far sooner than those who are apt to form a conservative judgment would expect. These drivers greatly dislike to have anything made automatic which they can handle themselves, especially when they know that the expert driver can get more work from the car if allowed to govern the advance.

It is impossible to draw a sharp line between the driver of ordinary skill and the expert. There are no sharp distinguishing features between the two, yet if many who think themselves proficient in the art of driving were to compete with the automatic advance in determining the distance which may be secured from a gallon of gasoline it would be surprising to note how many times the car having the automatic advance would prove the more economical. The reason for this is the fact that a great many drivers travel with the spark retarded too far. This is the cause of the greater consumption of gasoline with some cars than with others. A hill will be undertaken and the motor will knock slightly owing to the advance of the spark, and it will then be retarded. As soon as the hill is safely negotiated, instead of advancing the spark when the motor picks up, it will in many instances be left as it is, and the gasoline bill per mile is thus greatly raised, as there is nothing which burns up the fuel more wastefully than a late spark. Other bad effects are sure to come from the habitual running on a retarded spark, the greatest of these being, perhaps, carbon troubles and overheating.

The point at which the charge should be ignited varies to a great extent with the load, but there is one safe rule which even the most unaccomplished driver should have no trouble in following, and it is to advance the spark as far as possible without having a knock. When the knock occurs there is a strain on the motor which should be immediately removed. The ears of the motorist should be sharpened to a point where he readily hears anything which resembles a knock. If the new motorist will follow this rule the situation will resolve itself into a mere matter of experience and it will be long before he can detect the slightest knock.

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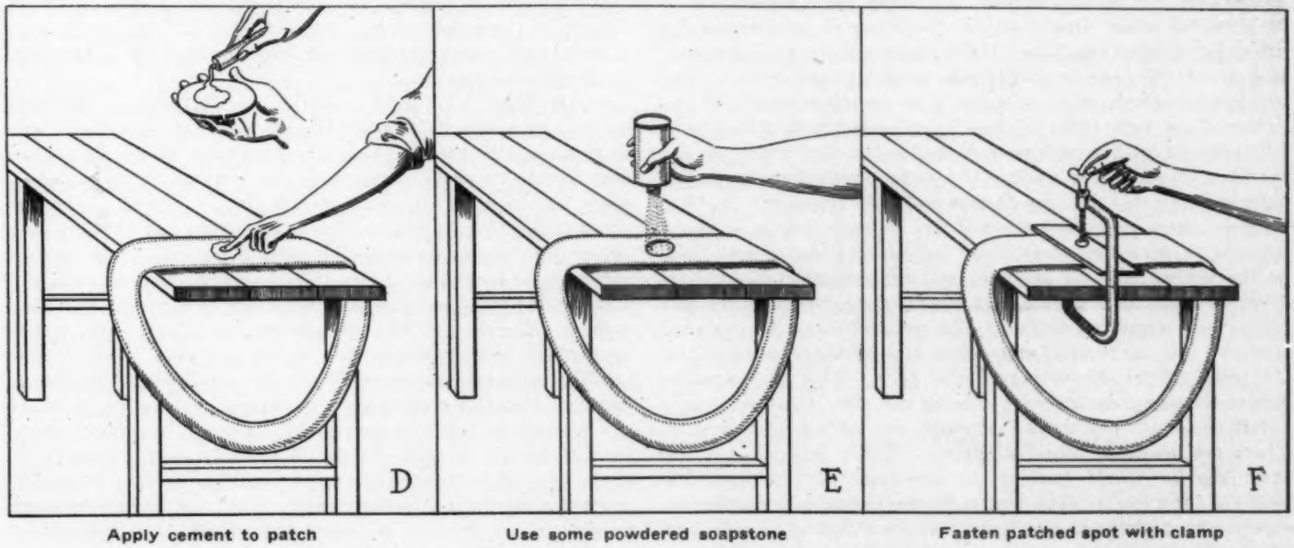
Cause of Noisy Differentials—As differentials are now made there is not much trouble with them in the way of noise, but it will occasionally be found that a rattling sound is heard. This is in the majority of cases due to the fact that there is lost motion between the driving pinion and the large differential wheel. The remedy for this is very readily applied in some rear axles; in others it is not. Very often there is a provision by which the pinion may be moved on its axis for a short distance so that the bevel gear teeth are brought more closely into mesh and the lost motion due to wear thus taken up.

A noise in this part of the mechanism should not be overlooked because it is sometimes difficult to reach; it should be nipped in the bud, as it is very apt to increase. Many owners will assume that it is merely a lack of lubricant and then proceed to pack the differential housing full of grease, which accomplishes to some extent the purpose of deadening the sound, but does not do any other good. In fact, in a short time it will be found that the noise will again occur and that this time it will be slightly harder to check, on account of the wear having progressed to a greater extent than has been realized on account of the muffling of the sound. Care in the cutting of the gears has everything to do with their life, and it must be said that in recent years the improvement in the art has been so marked that the life of the average differential set has been very markedly increased. At the same time adjustments for wear are provided in a greater number of instances than ever before. It is the case in some of the axles upon the market at the present time that, besides moving the pinion back on its axis, the other gear wheels may also be so shifted as to give perfect engagement after the adjustment has been made. This refinement is appreciated and made use of by the careful car owner when it becomes necessary.



Apply cement to patch — Use some powdered soapstone — Fasten patched spot with clamp

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When Relying on Batteries—There are still a few motorists left who are relying on batteries, though they are very scarce. A tip may be given, however, which may help these as well as others who have occasional use for the dry cell. The great tendency of the dry cell to suddenly expire without warning is well known. The fact that a dry battery may be at least partially resuscitated is not so well recognized. If a long nail is taken and a hole punched through the top of the battery so that water may be poured in it will be found that the battery will be given a little extra life.

The Ideal Automobile for 1913

Some of Our Readers' Conceptions of What Next Year's Car Should Be

Suggestions For Runabout to Cost Only About $400

EDITOR THE AUTOMOBILE:

I see "My Ideal Car" won't subside, especially the $4,000 and $5,000 kind. The wonder is, Where do all these millionaires come from that would not consider a $1,000 car? Even down here in Texas the talk often runs thusly: "I won't get me a car until I can buy a good one." "What is a good one?" "Oh, at least a $3,000 one." Then follow a few sneers at the lesser kind. I remember the time when all automobiles were runabouts. The first touring car was considered superfluous; a good many wondered whether anybody would buy it. And now a runabout is mostly a disgraceful little affair that trundles in the wake and the dust of the big touring car. The latter, with horsepower enough to carry seventy people—but it only carries seven—is too long for many a narrow street and as heavy as a locomotive. Of course, nobody can blame the manufacturer if he gives the public what it wants. But there is room and a demand for a cheap runabout. Unfortunately there does not seem to be an M. E. here or abroad who is able to get up one. For all cheap runabouts up to date, with the exception maybe of one or two, have been failures. For, be it understood, the successful runabout must be able to pass the big locomotive touring car on the road or on the track. This is absolutely necessary if it is to be respected. It must do that with two cylinders. It must, likewise, have some automobile looks. It must not look like a schoolboy's goat cart or have the bulldog outlines of one type, or the spider looks of another, nor the porcupine or 'possum looks of most touring cars with nose poking low in front and big moving-wagon rig behind. The runabout must have a carbureter; this carbureter must have the efficiency at least of the one used on the average motor cycle. The most popular carbureter might do for a big touring car with its power waste, but it could not touch the first-mentioned with a 40-foot pole. There are no doubt other carbureters equally as good, but the most popular would have to be eliminated in the runabout business for success. The one to be used should be capable of supplying the motor at any speed, but there should be no waste of gasoline.

In 1910 there came out a wire-wheel runabout, which, on paper, was to weigh 600 pounds, with two-cylinder, air-cooled, double-opposed motor, magneto, friction transmission, speed 2-40 miles, all ball-bearing, internal expansion brakes and plenty of other good points. When this 1910 production of a genius arrived there became at once visible several points that were not so good. The thing had a habit of stopping on the railroad track or any slightly elevated point. It took me several months to find out that the gasoline tank was 3 1-2 inches too low. When going down hill you had more gasoline than you needed, and up hill not nearly enough. Then the elliptic springs began to break and scatter along the road. No wonder. They were perforated with three big holes instead of being clamped. The splash lubrication was mostly on the outside of the car; in fact, almost the full length of the car. For the crankshaft rested on ball bearings; these let out the oil and noise in goodly quantities. The felt washers, sent several weeks later to stop it, did not fit snugly on account of the unmachined surface between crankcase and flywheel. The high-speed bearing holding up the propeller shaft had no provision for lubrication at all. The range of travel of this undersized, grimy pleasure car was 7 miles. The air-cooled engine then became too hot and stopped and one had to sit by the roadside for half an hour to let it cool. Then it would go on again for a mile, get hot again and stop. While the catalogue speed was, maximum, 40 miles an hour, many a hay motor overtook me on the road. The passengers in the touring cars which passed were, of course, highly amused over a fool buying a cheap car. The motor, a 3 1-2 by 3 1-2 double-opposed, should have cooled, for the same size cools well on a motorcycle, but it did not, in spite of a fan flywheel for crankcase cooling. The catalogue horsepower was 15, the theoretical about 7, but in actual practice, on account of carbon, popular carbureter and general low-down breed, only about 1 to 2 horsepower was realized. Yet this 1910 production was the most efficient runabout yet created on short runs. It at least showed what could be furnished for $400, with a little intelligence. For the correction of the mistakes mentioned above could, at most, amount to but a few cents.

Here, then, are the conclusions I have reached for a $400 two-passenger runabout:

A wheelbase of at least 90 inches, for the 80-inch wheelbase makes a jumpmobile. At a good speed front and hind wheels seem to strike an obstruction about the same time. I should suggest wire wheels for 28 by 3-inch tires with rims not made out of tin scrap, but of steel at least 1-16-inch thick. I know the prejudice against them, but the performances of the car will cure that. When the designer is sure of a good thing, he should likewise show a little backbone. There should be detachable or demountable rims to force any kind of a filled tire or rope on. No spare monkey business. A two-cylinder engine of at least 15 real horsepower, but certainly not double-opposed. The double-opposed engine is condemned in Europe, and more than that in America. It fouls spark plugs without any provocation, is mussy and vibrates as much as any of the others. The engine should be V-shaped or vertical. It should either be a European small-bore, long-stroke copied, or an American two-cycle engine, water-cooled; but the water jacket should not be cast to make weight, but be of brass or copper and shrunk on. It should be possible to muffle a two-cycle engine so that it does not make the noise of the taxicab—friction transmission—but there should be likewise a very low gear to enable the car to tackle a sand pile or pull a 40-50-horsepower touring car out of the mud. The steering wheel on the left, for be it known that many traffic ordinances compel one to stop with the right to the curb, and passengers should not have to walk around the car through the mud. The 56-inch tread will not do for the South; it takes 60 inches. Tubular axles; gasoline tank under the seat; splash lubrication well worked out with baffles and pump; elliptic springs supplemented with vertical coil springs; chain drive to rear. Of course, there should be some refinement about this car; some study. For instance, the gasoline might be turned off and on with a screwdriver or through a keyhole, screwdriver or key to be carried in owner's vestpocket to prevent theft or joy-riding; secret short-circuiting of magneto. Instead of the glass front windshield there might be a metal frame put up, with no glass, but devices or a sign to show that owner of this runabout is able to pay for a $3,000 touring car; not to forget Bosch magneto with genuine Bosch spark plugs, the whole to weigh 700 pounds.

E. H. ANDRAE.

Dallas, Tex.

My Best Repair—Making a New Wheel

How a Party of Tourists Solved a Difficult Problem

Skidded Against Rock and Dished the Front Wheel

With a Few Rude Tools Made and Fitted New Spokes

EDITOR THE AUTOMOBILE:

In answer to your invitation to readers to contribute their roadside experiences, I wish to relate a little incident which befell me on a recent tour through the northern part of New York State. There were four of us in the car and we were on our way to Plattsburg, where we intended to spend the night. It was a very threatening day during the month of July. The sky was dark and there were occasional rolls of thunder which echoed back and forth from mountain to mountain, while forked tongues of lightning streamed almost unceasingly across the sky. The members of the party were very uneasy.

We left Elizabethtown about 3 o'clock in the afternoon, intending to travel by way of Keeseville and then to take the fine state road which leads straight to our proposed destination. A chain of mountains lies between Elizabethtown and Keeseville and this had to be traversed. The going is pretty fair on some days, but a severe rainstorm which had occurred the same morning had put the roads in a very slippery condition, so that we did not make very good speed along this part of the route. The sky became darker and darker, while the thunder, together with the wildness of the surrounding scenery, filled everyone with a sense of foreboding. The wind had risen and was fairly shrieking around the car, so that it was impossible to make a word understood without raising the voice to the utmost. A certain mountain bearing the peculiar name of Pokamoonshine marks the highest point in the particular range which has to be traversed in the route we were taking. We had about reached this point when we noticed that the radiator was steaming, rendering it still more necessary to nurse the car gently along over the hills. We did not know whether to close up the top of the car as completely as possible, stop the motor and wait until the fury of the storm had passed or not, for it had now started to rain in small flurries and the difficulties of travel were greatly increased. We decided to go on, however, and so we did.

We had reached the downward slope of the mountain range when the full fury of the storm arrived. All that had gone before seemed a mere nothing. The air seemed completely filled with flash after flash, each more vivid and blinding than the last. Suddenly a large tree was struck within a few yards of the car and we decided to stop at the next clear place and wait. We had just reached this decision when a little dip in the road was encountered and the car began to slip. The brakes were jammed on, when to our horror the back of the car began to swerve. The brakes were released in order to stop this tendency, but it was too late. With a crash the car struck a boulder and stopped. The awful storm, which was the most violent which had ever been witnessed by any in the party, made the catastrophy seem worse than it was. No one wanted to get out to examine the damage, but during a lull in the storm, which was unbroken save for the steady downpour, it was ascertained that one of the rear spring clips had been broken and a front wheel badly dished.

We were 5 miles from anything that looked like a possible place for a repair, and it was up to one of the members of the party to walk. Lots were drawn and the unlucky victim of chance started on his lonely trudge through the mud and the still heavy rainfall. In the meantime it was agreed that we should attempt to make a temporary repair and follow along behind. A small piece of rope was made to serve as a spring clip, but the rear wheel was seemingly hopeless. The rain had commenced to die away and the breaking clouds gave promise of the weather clearing. Pipes were produced and it began to be a matter of conjecture how long it would take the unfortunate to get to some place where he could bring us assistance, when suddenly the subject of our conversation appeared around the bend in the road and in a few moments was with us. To our agitated inquiries he replied that he had come across a lumber camp down the road and that there were a few tools and an unlimited supply of wood to be had. This did not seem rather hopeful to us at the time and several members of the party did not hesitate to voice their opinion on the matter, stating that by this time the worthy pedestrian would have reached some kind of a house where he could have secured a rig and gone to a garage. The argument ended by the whole party starting for the camp. When this was finally reached some axes and a draw-shave were borrowed and the place turned into an amateur spoke factory.

Just about the time that our watches registered midnight the set of rough spokes were finished and ready to be shrunk into the metal felloe. This was accomplished at last under severe difficulties and resulting burned hands, but it was a rather more hopeful party that started back to the deserted automobile. This was finally reached and found to be in good condition. The rough-looking wheel was fitted and the car started on its way. After a long, slow and risky trip Plattsburg was reached and the car left at a garage for permanent repairs while the party agreed that a little sleep would be most acceptable.

After a short stay in Plattsburg our tour was continued, and all that remained of the experience was the memory and the old wheel, which I still cherish as a souvenir.

Centreport, N. Y. M. F. BRONSVELD.

Leaky Gasoline Tank

Editor THE AUTOMOBILE:

I once had a leak in the flange of the gasoline tank where it is bolted down to its base under the seat. The space between tank and vertical walls inclosing it was 1-2 inch wide and there was no possibility of soldering the leak with the tank in place.

I therefore took a 1-8-inch copper pipe and passed a doubled-up wire through it which was more than twice as long as the pipe, so that a bolt could be held loosely in the loop thus formed. After shellacking the leak on the upper and lower side of the bent portion of the sheet metal, I put a leather washer on the shellacked hole both above and below the metal, and then put the bolt in place by means of the copper pipe and wire loop. By pressing the loop toward the surface of the metal I was able to leave the bolt in its place in the hole and withdraw the wire. By means of a nut screwed on the lower end of the bolt I then procured a close fit around the bolt, and no gasoline has ever leaked by it since the repair was made some 5 months ago.

The wire loop held in the tube has since proved useful on several occasions. I have put it to a variety of uses; it is easy, for instance, by the use of this simple device, to fish out a bolt or small tool that has fallen into the crankcase, by passing the tube and wire through the handhole and fishing for the lost part. If you feel the part, there is no difficulty in getting it into the loop to remove it by pulling up the tube.

New York. H. C. TOWNSEND.

Automobile Metallurgy Made Easy

By E. F. Lake

Part XII—Forged Steel

By This Method It Is Possible to Cheaply Produce Shapes for Automobile Use That Can Be Secured in No Other Manner

MANY parts of an automobile are made from forgings. The shapes that can be produced in this way are almost as intricate as those that can be made by casting in sand molds. As the metal is hammered or squeezed into shape, the grain does not have the crystalline nature of castings, but is refined as much as the grain of steels that have been rolled. Forgings therefore are much stronger than steel castings and in many cases they excel the strength of rolled steels. Shapes can be produced in this way that it is impossible to roll, and it is a much cheaper process than would be machining them out of bar stock. When considerable strength is required, therefore, and the part is complicated enough to cause a saving over the method of machining, forgings are usually made. In fact, the parts that can be made better by forging them are so numerous that several automobile factories have put in their own forging plants.

When the automobile industry was young, attempts were made to make the front axle from tubes; thus following the practices of the bicycle factories. Later, attempts were made to make these from castings. In both cases such axles were either cumbersome or heavy when the required strength was attained. These practices therefore gave way to forging and the front axles of nearly all cars are now forged. A greater strength was then obtained per square inch of cross section than could have possibly been secured from rolled or cast steel, or other materials.

The crankshafts of the engine, as well as the camshafts, are also forged to nearly the required size and afterward machined. In the crankshaft in particular the grain of the metal can be made to follow the bend of the shaft and thus enable it to more readily resist strains and stresses. A much smaller amount of stock is then required in their manufacture than if they were machined out of the solid bar. Other important parts that are usually forged are the piston connecting rods, blanks from which to cut gears, steering knuckles, clutch and universal-joint parts, lamp brackets and many of the smaller levers and connecting rods that might be strong enough when made from brass or bronze castings but can be made lighter and cheaper by forgings. The rear axles are also made from forgings by some manufacturers, although these are usually of tubular construction and built up.

In the early days of the automobile, when but one or two were made at a time, the forgings were hammered out by the blacksmith with a hammer and anvil. But few parts were then forged as this was an expensive way of making them. As soon as the cars began to be made in quantities dies were made and drop forgings made in these dies. These dies are made in two parts; one of which is fastened to the bed plate or anvil block of a forging press, the other being fastened to a block that is raised and then dropped upon a piece of metal that is heated to a white heat and held over the lower die block. To form this white-hot steel to the shape desired an impression corresponding to this shape is cut in the halves of the die block. Usually one-half of the impression is cut in the lower part of the die block and the other half in the upper part, but the shape of the piece governs the amount of the impression that should be cut in each half. This is the cheapest way of making forgings, as many pieces can be made during a day's run; the number depending on the size, shape and intricacy of the piece.

The same rules for the temperature of steel when rolling it should be applied to the forging. That is, it is usually heated to about 2,000 degrees Fahrenheit and the forging operation should be finished while the temperature is falling from 1,650 to 1,400 degrees Fahrenheit. Rolled steels are always used when manufacturing drop forgings and the grain has thus been refined from that of the cast state. Where most metals are heated to above 1,400 degrees Fahrenheit, they coarsen and the higher the temperature above this figure the coarser will be the grain. The hammering that is given the metal in the drop-press, however, refines this grain and brings it back to its former state, if the temperature during the finishing operations has been correct.

Where forged pieces are too thick, the blow from the upper half of the die, and its holding block, may not be powerful enough to penetrate to the center of the metal and thus refine its grain all the way through. The piece would then have a ring of strong, dense metal around the outer surface, while the interior grain would be crystalline and easily broken. When such a piece is submitted to torsional or vibrational strains, it begins to check and these in time develop into large cracks that produce a breakage. In forgings therefore it is necessary to know that they are properly made before putting too much trust in them. An idea of what they will stand can easily be obtained from samples that are given the various strength tests mentioned in former articles.

Pressing forgings into shape instead of hammering them has lately been developed to a point that will make them a close competitor of drop forgings. This is due to improvements that have been made in the hydraulic press. Instead of giving the metal a series of sudden blows, as in the drop-forging press, it is gradually squeezed or pressed into the desired shape by a hydraulically operated ram. The applied pressure causes the molecules of metal to gradually flow to the position they are required to occupy for giving the forging its proper shape. It requires a very great pressure to cause these molecules to flow

STRENGTHS OF LOW-CARBON STEELS WHEN ANNEALED AND AFTER HEAT-TREATMENT

CHEMICAL COMPOSITION					MECHANICAL PROPERTIES								
					Annealed			Hardened			Cold Drawn		
Percentage of					Pounds per Sq. In. of			Pounds per Sq. In. of			Pounds per Sq. In. of		
Carbon	Manganese	Silicon	Phosphorus	Sulphur	Tensile Strength	Elastic Limit	% of Elongation	Tensile Strength	Elastic Limit	% of Elongation	Tensile Strength	Elastic Limit	% of Elongation
0.10	0.20	0.10	0.02	0.03	60,300	36,300	29	66,000	40,300	24	70,200	54,300	33
0.15	0.33	0.05	0.03	0.05	61,500	35,200	27	73,100	39,600	22	80,000	71,400	32
0.22	0.45	0.15	0.05	0.05	66,500	41,200	26	99,400	54,000	14	..	..	..
0.30	0.60	0.20	0.04	0.04	72,400	47,400	24	118,200	77,300	13	..	..	..

AUTOMOBILE

to a different position and thus they are pressed very closely together. This insures a dense, homogeneous grain, and makes the metal stronger and tougher than steels that have been rolled.

When a shape is too intricate to forge in one piece, two or more separated forgings can be made and these afterward welded together. The heat-treatment given forgings is of as much importance as is their quality, as good forgings can be spoiled by improper heat treatment or poor forgings can be made much better by proper heat treatment, *i. e.*, annealing, hardening and tempering. In heating and cooling steels quite a difference can be made in the coarseness and fineness of the grain and in the hardness and softness of the metal. It is thus important that the proper amount of skill and knowledge be used in preparing forgings for the car, so steering knuckles or like parts will not break and cause fatal accidents.

Harking Back a Decade

FROM *The Motor Review* February 6, 1902:

The Cyclorama at Indianapolis will be the scene of an automobile and cycle show the third week of this month and the dealers are enthusiastic over the prospects. A feature of the show will be a series of climbing tests, the contestants being obliged to mount an incline 60 feet high extending to the dome of the building.

The Morgan Motor Company, of Worcester, Mass., has been incorporated for $50,000. Charles H. Morgan is president and Ralph Morgan, his son, will be identified with the manufacturing department.

Protests have been made against reporting the Cocks bill favorably. A delegation of New York automobile enthusiasts went before the committee last week and asked for a rate of 10 miles an hour in cities and 20 miles an hour in the country. Another bill has been introduced meeting those conditions and also providing a sliding scale of penalties. This bill calls for a fine of $25 for first offenders; $50 for second, and for third and subsequent offenses, $50 or imprisonment for not more than six months.

The first of the vehicles of the Republic Motor Vehicle Company to be delivered to the Minneapolis postoffice has had its official trial trip. The car covered 10 1-2 miles in one hour, making fifty-five stops.

The White Sewing Machine Company is turning out cars at the rate of seven a week. Manager Waite reports that sales are lively despite the cold weather and that many customers are taking immediate delivery.

Promoter Pennington, who has been engaged in pushing the stock of the Pennsylvania Steam Vehicle Company, which makes the Tractobile, is not making much headway. The extravagant statement of details, the wild estimates of demand, cost and profits, the totally unauthorized use of the name of a prominent company, all combine to stamp the scheme as a stock-selling business pure and simple.

It is plain at the present time that the French have relegated to a subordinate place the large, heavy and very fast cars and are devoting themselves to the perfection of gasoline pleasure vehicles of moderate weight and speed, and with noise, vibration and other elements of discomfort reduced to a minimum. The efforts of both British and American manufacturers are likely to be directed along the same lines.—(*Editorial.*)

Calendar of the Coming Automobile Events

What Future Has in Store for the Motoring Enthusiast

Shows

Jan. 27-Feb. 10.....Chicago Coliseum, Eleventh Annual Automobile Show, under the auspices of the National Association of Automobile Manufacturers. Pleasure cars, first week Commercial vehicles, second week.
Jan. 27-Feb. 10.....Pittsburgh, Pa., Sixth Annual Show, Automobile Dealers' Association of Pittsburgh, Inc. Pleasure cars first week. Commercial vehicles, second week.
Feb. 3-10.....Montreal, Canada, National Show, Drill Hall, Automobile Club of Canada.
Feb. 3-10.....Harrisburg, Pa., Third Annual Show, Arena.
Feb. 5-17.....St. Louis, Mo., Coliseum, Annual Show, Pleasure cars, first week. Commercial vehicles, second week.
Feb. 10-17.....Atlanta, Ga., Auditorium-Armory, Atlanta Automobile and Accessory Dealers' Association.
Feb. 10-17.....Youngstown, O., Auditorium, Second Annual Show.
Feb. 12-17.....Ottawa, Ont., Howick Hall, Annual Show, Ottawa Valley Motor Car Association.
Feb. 12-17.....Kansas City, Mo., Annual Show, Combined Association of Motor Car Dealers.
Feb. 12-17.....Troy, N. Y., Second Annual Show, State Armory, Troy Automobile Dealers.
Feb. 12-19.....Dayton, O., Third Annual Show, Dayton Automobile Club.
Feb. 14-17.....Grand Rapids, Mich., Third Annual Show.
Feb. 17-24.....Pittsburgh, Pa., Second Annual Show, Exposition Bldg., Pittsburgh Auto Show Association, Inc.
Feb. 17-24.....Cleveland, O., Annual Show.
Feb. 17-24.....Newark, N. J., Fifth Annual Automobile Show, New Jersey Automobile Exhibition Company, First Regiment Armory.
Feb. 17-24.....Minneapolis, Minn., National Guard Armory and Coliseum, Annual Show, Minneapolis Automobile Show Association.
Feb. 19-24.....Omaha, Neb., Seventh Annual Show, Auditorium, Omaha Automobile Show Association.
Feb. 19-24.....Hartford, Conn., Annual Show, Automobile Club of Hartford, State Armory.
Feb. 19-26.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 20-24.....Binghamton, N. Y., State Armory, Third Annual Show, Automobile Dealers' Association.
Feb. 20-28.....Baltimore, Md., Annual Show, Baltimore Automobile Dealers' Association.
Feb. 21-25.....New Orleans, Washington Artillery Hall, New Orleans Automobile Dealers' Association.
Feb. 21-28.....Toronto, Ont., Annual Show, St. Lawrence Arena, Canadian National Automobile Association.
Feb. 24-March 2....Brooklyn, N. Y., Twenty-third Regiment Armory, Annual Show, Brooklyn Motor Vehicle Dealers' Association.
Feb. 26-Mar. 2.....Paterson, N. J., Annual Show, Fifth Regiment Armory, Paterson Automobile Trade Association.
Feb. 26-Mar. 3.....Quincy, Ill., Highland Park Stone Pavilion, Annual Mississippi Valley Show, Quincy Auto Club.
Feb. 27-Mar. 2.....Elmira, N. Y., Second Annual Show, Elmira Automobile Club.
Feb. 28-Mar. 2.....Davenport, Iowa, Annual Show, Davenport Automobile Association.
Feb. 29-Mar. 2.....Fort Wayne, Ind., Fort Wayne Automobile Show Association.
March 2-9.....Boston, Mass., Tenth Annual Show, Boston Automobile Dealers' Association, Inc.
Mar. 2-9.....Columbus, O., Annual Show, Columbus Automobile Club.
March 4-9.....Reading, Pa., Reading Railroad Shops, Annual Show, American Exposition Company.
March 12-16.....Denver, Col., Auditorium, Annual Show, *Motor Field*, A. Wahlgreen, Manager.
March 6-9.....Louisville, Ky., Fifth Annual Show, First Regiment Armory, Louisville Automobile Dealers' Association.
March 6-9.....Tiffin, O., Second Annual Show, The *Advertiser*.
March 12-16.....Syracuse, N. Y., Fourth Annual Show, State Armory, Syracuse Automobile Dealers' Association.
March 25-30.....Indianapolis, Ind., Annual Show, University Park, Indianapolis Automobile Trade Association.

Race Meets, Runs, Hill Climbs, Etc.

Feb. 17-18.....New Orleans, Track Races, Fair Grounds, Mardi Gras.
Feb. 22.....Bakersfield, Cal., Annual Road Race.
April 27.....Philadelphia, Annual Roadability Run, Quaker City Motor Club.
May 15-17.....Chicago, Ill., Commercial Vehicle Test, Chicago Motor Club.
June 20.....Algonquin, Ill., Annual Hill-Climb, Chicago Motor Club.
Aug. 8-10.....Galveston, Tex., Beach Meet.
Oct. 7-11.....Chicago, Ill., Reliability Run, Chicago Motor Club.

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Chicago's Business Show

CHICAGO has set a pace in the matter of business shows, during the past week, that will be very difficult to eclipse, and has established such a record for real business done that many of the doubting exhibitors, who have been wondering whether or not shows have outlived their usefulness, have taken to the broad plains of the West. There is no longer any doubt as to the real value of the Chicago show. Last year some exhibitors were not satisfied with the business done, but this year there has been no complaint.

Business done at a show depends on the exhibitors. Some exhibitors go to a show with the thought of not doing much retail business and not doing any agency or sub-agency work, and they are not disappointed. At the same time other exhibitors go to the show with the aim of doing business, and they, too, are not disappointed. Each class gets what it really goes after.

The party that does not go after business is the poor patron of the show; he is the one who has been talking against shows; trying to establish the facts that the day of shows is over, that they have outlived their usefulness and that the business would get along just as well without them. This is the same thought that the Frenchman had several years ago: The big Paris show, to him, had come to an end; his car was so superior to those the other countries were able to build that he feared the competition of the foreigner neither in his own market nor in the world at large. This same high and mighty Frenchman did not need shows nor even races. To-day he is a more humble quantity. He is now talking about a show every year and he is going to revive racing the present season. Both are imperative. The Frenchman's business has been falling off, in spite of his amazing lead.

So it may be with several of our American high and exclusive makers, who do not want shows, who think their day is over and who consider them but a useless expense. The reputations of these people can wane as fast as those of other concerns can mount up. These are days and this is an industry in which present merit is of more importance than tradition. It is the value of the goods that counts. Concerns should be heedful of the present taste of mind of the public.

Compared with those who do not want shows, and talk about the poor business done, and the lack of interest, are those who go to the shows to do business, and they do business. Generally these people set out months in advance to do show work. They write to all of their agents, and the agents write to sub-agents and prospective buyers. When show time comes round, the dealers all come to the show and bring with them their sub-agents and those who are going to become sub-agents. At the factory there has been as much activity: The sales manager has trained every salesman in the art and science of selling the company's cars. Every possible argument has been gone over. Each salesman has been rehearsed time and time again on these arguments, and by the opening day there is scarcely a solitary question that any show visitor would dare to ask that the salesman has not the reply on the tip of his tongue. All has been prepared in advance. Instead of half a dozen salesmen in the booth there may be ten and perhaps twenty. This army of salesmen is as keen as that to be found in any retail business house in the country. They have gone to the show to do business; that is the main reason the company has had in sending them, and if they are to hold their jobs it is expected that they will get prospects if they do not sell cars.

Compare the mental state of this salesman with his fellow sent by a company that does not expect to sell cars, but who goes to answer a few questions if he feels like doing so. The man who goes to do business, goes to each prospect with grim determination. The prospect is impressed, the interest of the salesman is contagious and many who came to look around remain to buy. This is making shows necessary, it is the way to make a success out of them, and it is the way to continue them and keep the industry booming.

Those makers who have not in the past gone to the show to do business should change their minds before next season. The industry demands such action. Shows are valuable; they must be continued. Every car maker in the country would be compelled to cut down his output for 1913 if there was not to be a show held next January. The advertisement that the show gives the industry cannot be overlooked. It is a tremendous power. It is a campaign of publicity that reaches from one side of the country to the other. It reaches every city and hamlet. It starts talk about automobiles, and this talk soon becomes desire and the desire soon leads into the field of actual possession. Every maker should stop his criticism; he should talk shows, he should believe in shows and he should do everything to continue shows. This is the only real way to go to a show.

Garden Deed will Be Ready February 14

Title to Be Taken as of Monday and Big Hall Will Remain

NEGOTIATIONS as to the sale of Madison Square Garden, which will have a distinct bearing upon the future of that building, are still in progress. The utmost secrecy prevails among all the parties involved, but the latest word concerning the matter is that the corporation that has figured so far as probable buyer of the building will hold a meeting of its directors on Thursday or Friday to take definite action.

When the deed has been signed, it will date from Monday, February 5. It has leaked out that the present holding company has decided to retain all its present employees, at least as far as continuing their salaries is concerned, until May 1. Some of these employees have worked for the corporation for many years and many of them are in menial positions.

From the attorneys of the tentative buyers it was learned that the original plan suggested to build one huge office building had been abandoned. Nothing further has developed and the general impression prevails that even the close insiders do not know just what will be done in the event of closing the sale.

The Automobile Board of Trade holds a lease on Grand Central Palace and an agreement for a lease on the Arena building when it is ready for occupancy, and it is said that the lease on Madison Square Garden contains a clause to make it self-perpetuating in the event of that building being retained.

Vice-president Newman, of the New York Central Railroad made the following official announcement as to the Arena project on Wednesday: "The railroad company is not engaged to build the Arena. The whole interest of the company is limited to leasing the ground to the company that proposes to build the structure. It will not be built in the present if the company now negotiating for Madison Square Garden consummates its deal and preserves the Garden building."

The above statement was submitted to the management of the Grand Central Palace and the following statement was made by Managing Director Spratt.

"There will be no necessity for rushing the Arena to completion in case Madison Square Garden is to be preserved. It could be done easily as may be seen from the fact that the present Grand Central Palace required only 8 months, 18 days to finish. The Arena could be completed even faster, because it would not be built with such an elaborate interior. We are all ready to start steel work tomorrow if the negotiations looking toward the preservation of the Garden fail and it is determined to tear down that building."

Present indications point to the existing show buildings as the scene of the 1913 shows and also to the building of the Arena according to a leisurely schedule which will save something like a total of $100,000.

The situation as it stood Wednesday afternoon showed considerable progress. Announcement was made that the F. & D. Company would take title to the property as of last Monday, but that the last detail of the consummation of the deal would not be accomplished before February 14.

Whether the F. & D. Company will operate the building or lease it to an operating company is still uncertain. It is understood that the financing of the project required $2,250,000 more than was originally expected.

The A.A.A. and M.C.A. Ratify Contract

CHICAGO, Feb. 5—New Orleans is the tentative finishing point of this year's annual tour of the American Automobile Association, according to the decision of the executive committee of the A. A. A., which met here during the show, the first session being held Friday. This was followed the same night by a meeting of committees representing the A. A. A. and the Manufacturers' Contest Association, which ratified the old pact between the two organizations. The only change in that agreement is that the agreement may be terminated with 1 month's notice instead of 3. William Schimpf will continue as chairman of the contest board.

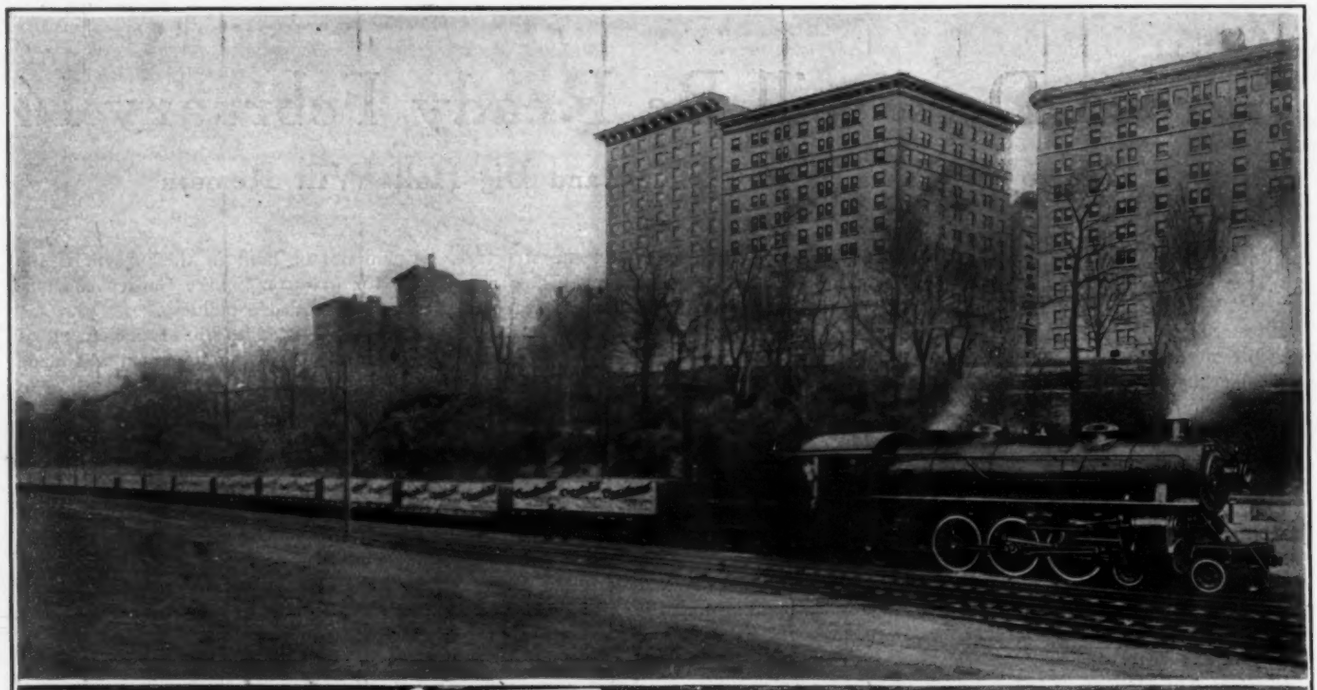
Considerable enthusiasm was worked up over the annual tour and while the exact route has not been definitely outlined, certain it is that the annual contest will follow a trail starting from some Northern point and ending in the South. The Glidden no longer will be the main trophy and just what will be done with it has not been decided. Probably it will be used as a minor trophy, something on the order of the Anderson cup. The main trophy will be a $5,000 bit of plate which will be put up through subscription on the part of the various state associations and which will be known as the National trophy. Already $1,400 has been contributed by the associations represented at the meeting. David Beecroft is chairman of a subcommittee appointed to raise this money.

The approval of New Orleans as the finishing point of the tour depends upon what that city will do in the way of helping finance the contest. It has been determined that the tour shall be mainly for amateurs and because of that, the entry fee shall not be more than $25 per car. Of course, the money raised this way would not be sufficient to pay expenses; so it will be up to the cities selected for the start and finish to help along, while big points along the way will be expected to chip in. Atlanta and Jacksonville last year contributed $6,000 to the tour fund and it is thought that at least this much should be forthcoming this year.

There are at least five cities being considered for the start—Detroit, Buffalo, Indianapolis, Cleveland and Cincinnati. Detroit, it is said, already has started a movement to raise a purse to get the plum, while the Hoosiers also are awake to the possibilities. Starting from a Northern point this way, the trail undoubtedly will take in Chattanooga and Atlanta as it pierces the South.

Jersey Takes Up Reciprocity Bill

Urgent efforts are being made to have Bill 22, recently introduced in the lower house of the New Jersey legislature, favorably reported and passed. The various automobile organizations of the state are behind the bill, which provides for reciprocity for interstate traffic of automobiles and dispenses with the noxious power-of-attorney clause contained in the present law, which has been so generally condemned.



NEWS of the WEEK CONDENSED

Arrival at New York of a train of thirty-one cars loaded with a foreign shipment of Overland automobiles

SPECIAL TRAIN FOR OVERLANDS—The Willys-Overland Company, of Toledo, O., recently sent to New York a special train of thirty-one flat cars, each of which carried three Overland automobiles. The ninety-three cars were a part of the export trade of the company. After the arrival in New York they were transferred to ships and distributed to all parts of the world.

R. C. H. in Canada—The R. C. H. Corporation of Canada, Limited, of Wakerville, Ont., is advertising a 25-horsepower touring car with self-starter.

York Garage Adds Metz to Its Line—The York Garage & Supply Company, 116-118 East Market street, has added the agency for the Metz cars to its line of Pullman, Everitt, Stearns and Hudson cars.

Canadian Tire Company—The Independent Tire Company, of Toronto, Limited, is building a factory at Guelph, Ont., and expects to fill all orders from the plant, which it hopes to have in operation in a few months.

McCaughy Manager of Adams Foundry—W. D. McCaughy has assumed the general management of the Adams Brothers foundry and machine shops in Findlay, O. Adams Brothers are the makers of the Adams truck.

Aluminum Factory in Mauston, Wis.—An aluminum factory is being established in Mauston, Wis., by experienced aluminum men from Two Rivers, Wis., which is the center of the industry in the Northwest. Walter Marvin, Emil Frenz and Robert Stegman, who have been associated with the big aluminum interests at Two Rivers, are behind the project.

McClellan Leaves Maxwell for R. C. H.—W. H. McClellan, for some years with the United Motors Boston company selling Maxwells, resigned last week to accept a position with the Boston branch of the R. C. H. corporation. He was formerly connected with the St. Louis agency of the Hupmobile.

Pittsburgh Company Moves—The H. W. Johns-Manville Company, manufacturer of asbestos and magnesia goods, has been forced by growing business to take larger quarters. The company has leased the eight-story stone building at the corner of Wood street and First avenue for a term of years.

Locomobile Gets Minneapolis Establishment—The Locomobile Company of America has leased the former garage, showroom and offices of the Twin City Taxicab Company, 832 Hennepin avenue, Minneapolis, Minn., and will put in a full line of cars and trucks. M. P. Leihy is manager.

North Dakota's Automobile Fees—In 6 months after July 1, 1911, the State of North Dakota netted $17,661.80 from automobile taxation under the state law which became effective last year. The sum was apportioned to counties for improvement of roads. The income of the department was $22,447, covering 7,261 automobiles and 261 motorcycles.

By-law to be Resubmitted—At the next meeting of the City Council of Woodstock, Ont., the aldermen will have before them a recommendation from the Board of Trade asking that a by-law granting $3,500 to the Woodstock Automobile Company for the purchase of a building be again submitted to the people. The by-law was voted down in January after the industrial committee had guaranteed that the city would put up the money. On the strength of this guarantee the company had installed its plant and was operating until a few weeks ago. The concern is now practically at a standstill.

McAlman Won the Drawing—At a dinner given by Manager J. B. McDonald, of the Hotel Lenox, to the members of the Boston Automobile Dealers' Association and members of the Bay State A. A. who handle motor cars, a drawing was held for the privilege of exhibiting a car in the lobby of the Lenox during show week. There were more than fifty members present and President E. A. Gilmore, of the Bay State A. A., and Manager Chester I. Campbell, of the Boston automobile show, conducted the drawing. Just forty-nine cards were picked out and President J. H. MacAlman was the lucky man. He handles both the Stearns and the Columbia in Boston, but he has not yet made up his mind which one of the two cars he will exhibit in the hotel.

Self-Starter Agency in Syracuse—The Central City Rubber Company has the Syracuse, N. Y., agency for the Meteor self-starter.

Johnson to Sell Locomobile—F. H. Johnson is now agent for the Locomobile in Syracuse, N. Y., and has received a 1912 demonstrator.

Ohio Now in Boston—The Ohio car is represented in Boston now by Herbert L. Converse, who is going to make a strong campaign for its sale.

New Truck on the Market—The Powell Engine Corporation, 47-49 Lincoln Place, Brooklyn, N. Y., is manufacturing the new 1 1-2-ton Powell truck.

New Clark Car—The Clark Motor Company, of Shelbyville, Ind., has put a new model on the market. It is a five-passenger, 40-horsepower touring car.

Opens New York Office—The Connecticut Telephone & Electric Company has opened an office, stock and showroom at 231 W. Fifty-fourth street, New York City.

Mitchell in Quebec and Montreal—The Legarre-Gadbois Automobile Company, Ltd., of Montreal and Quebec, is handling the Mitchell car for the Province of Quebec.

Auto Supply Company to Have New Store—The Syracuse Auto Supply Company, Inc., will have a new store in the Curney Building, Syracuse, N. Y., to be in charge of B. R. Newhall.

New Case Agency in Montreal—The Case Motor Car Company has opened an agency in Montreal, Que., for the sale of the Case car. The garage is situated at 609 Mount Royal East.

Sauter & Tuttle Get Overland Agency—J. W. Lee, of the Overland-Syracuse Company, has arranged with Sauter & Tuttle, of Canastota, N. Y., for the exclusive handling of Overland cars in Madison County.

Bond Company's New Garage—The Bond Motor Company, Franklin dealer in Kansas City, Mo., is erecting a three-story garage, with a frontage of 50 feet and a depth of 135 feet, located on the busiest part of Kansas City's automobile row.

Syracuse Club Incorporated—The Automobile Club of Syracuse has now become an incorporated body, the papers having come from Albany during the past week. It was decided to do this following the withdrawal from the New York State Automobile Association.

Garage Changes Hands—The Sanford Avenue Garage and premises at Sanford avenue and Twenty-fifth street, Flushing, N. Y., have been leased by Jockers & Stack, proprietors of the Queensboro garage, who will operate it as an annex to their present garage at Nos. 66 and 68 Broadway.

Wolseley Branch in Winnipeg—The Wolseley Company, of London, England, is opening a branch in Winnipeg, Man., in connection with the wholesale depot recently opened at Toronto, Ont. It is placing on the market four models specially adapted for Canadian conditions.

Kelly-Springfield Branch in Buffalo—The Kelly-Springfield Tire Company, of New York City and Akron, O., has effected arrangements with the Seneca Rubber Company, whereby a direct factory branch has been opened at 912 Main street, Buffalo. This branch will have charge of western New York, northern Pennsylvania and Canada.

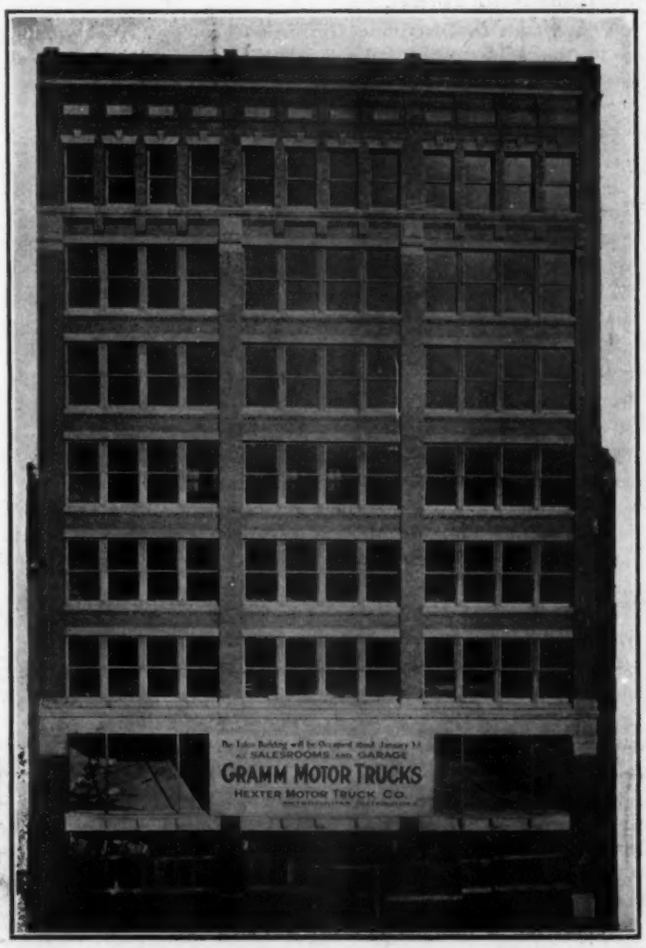
Ostendorf President of B. A. T. A.—George Ostendorf, of Buffalo, was elected president of the Buffalo Automobile Trade Association at a meeting of the board of directors of that organization last week. Other officers chosen by the directors were: Vice-president, William R. Densmore; secretary, Gustave C. Miller, and treasurer, E. C. Bull.

Two Detroit Items—P. W. Schulte & Sons, 701-707 Grand River avenue, Detroit, Mich., have taken the local agency for the Paterson. The concern has an up-to-date garage and is prepared to give service with every car it sells. A. A. Crumley has been appointed manager of the new Detroit branch of the Marquette Company, at 1237-1241 Woodward avenue.

New Agents Appointed—The T. G. Northwall Company, of Omaha, Neb., made contracts for Brush, Courier, Clermont and Detroiter cars last week with the following dealers: I. C. Eastman, Clarinda, Ia.; Whittaker Implement Company, Red Oak, Ia.; William Gehrts, Murdock, Neb.; C. J. Hanson, Harlan, Ia.; H. P. Hanson, Exira, Ia., and Aurora Lumber Company, Flakington, S. D.

Little Returns to Spartanburg—S. C. Little, of Spartanburg, S. C., who has been manager and buyer of the accessory department of the United Motor Charlotte Company, a branch of the United States Motor Company, located at Charlotte, N. C., has resigned his position with this company. Mr. Little will go to Spartanburg, S. C., where he will immediately open up a retail and wholesale automobile supply and accessory business under the name of Little Automobile Supply & Acessory Company.

Gramm Opens New York Home—The Hexter Motor Truck Company, New York, branch of the Gramm factory of Lima, O., has completed the construction of its new quarters at 431 W. Forty-second street, New York City, and has begun its removal thereto from its place at 103 W. Fifty-first street. The new building contains the sales and showrooms of the company, as well as a garage fully equipped to house 250 freight automobiles. The building is an eight-story structure, built entirely fireproof and with sprinklers installed along all the ceilings. Each floor has a space of 75 by 100 feet, and two large freight elevators are used to lift and lower the trucks to and from the floors. In connection with this vast garage the Hexter company conducts a modern service department for freight automobiles, and contracts for the complete maintenance of Gramm machines.



New home of Gramm trucks in New York City

New salesrooms and garage of the White Company at Craig street and Atherton avenue, Pittsburgh

DePere, Wis.—The DePere Motor Car Company has been organized by J. J. Hallett and D. J. Miller to handle the American in the Wisconsin territory, excepting Milwaukee and southern counties.

Paige-Detroit in Baltimore—The Paige-Detroit car will be handled in Baltimore, Md., by Harry M. Crouch and Percy W. Schall. Their new location will be at Ditch's Garage, Mount Royal and North avenues.

Wentworth to Distribute Garfords—Frank E. Wentworth, of Boston, Mass., New England distributor of the Overland line, has been appointed to a similar position with reference to Garford pleasure cars and trucks.

New Establishment in Milwaukee—August Prange, formerly of Potter, Wis., has opened his new garage and salesrooms at 401-404 North Seventh street, Sheboygan, Wis. He represents the Ford and Moline.

New Body Shop in Reading—A new automobile business, comprising a garage and repair shop, was recently opened by M. E. Renner, rear 118 South Queen street. Mr. Renner does all kinds of automobile body building.

Whitney-Barney Company Takes Chadwick—The Whitney-Barney Company, of Boston, agent for the Selden, Lion and the Gramm truck, has added another car to its list, having just taken on the agency for the Chadwick Six.

Brockton Dealers Organize—The Brockton, Mass., Automobile Dealers' Association was formed at a meeting here last week, and it starts off with nineteen members. It is expected that the entire twenty-five dealers will join shortly.

Appleton Garage Changes Hands—Elmer Bleick, agent for the Overland and Warren and the Kissel truck at Appleton, Wis., has disposed of his garage and business to A. H. Gorges, representing the E-M-F and Cadillac. Mr. Bleick will retire.

Schaum Leaves Walker Company—Howard M. Schaum has resigned his position with the D. C. Walker Auto Company, Cole, Stearns, E-M-F and Grabowsky representatives in Baltimore, to accept a place with the Fairbanks company, which he formerly represented.

Murphy to Manage Truck Company—J. W. Murphy, of Boston, who for two years has been identified with the Garford, has been appointed manager of the truck department of the Whitten-Gilmore Company to handle the Federal and Dayton trucks in New England.

Hudson Sales Company Changes Name—The name of the Hudson Sales Company, of Washington, D. C., has been changed to the Storm Motor Car Company. The company is located at 1012 Fourteenth stret, N. W., and in addition to the Hudson has taken the National agency. C. M. Storm is the general manager.

New Company in Washington—The Matheson Motor Company, of Washington, D. C., has been formed to handle the Matheson in this city. E. K. Fox, a well-known real estate operator, is head of the company, which has secured quarters in a new building adjoining the Masonic Temple on New York avenue.

Jones Company Selling Only Cadillac Now—The Jones Automobile Company, 421 Wells street, Milwaukee, Wis., for many years representative of the Peerless and Cadillac, is now confining its efforts to the sale of the Cadillac. The Chicago Peerless branch will handle Milwaukee business until new representation is secured.

White Company's New Garage—The new garage and salesroom which the White Company is erecting in Pittsburgh, Pa., will be ready for occupancy about April 1. The building is situated at Craig street and Atherton avenue. It will have 42,000 square feet of floor space and will accommodate 300 cars. It will be fireproof throughout and will cost $150,000.

Abbott-Detroit in Maryland—The agency for the Abbott-Detroit cars in Maryland, the District of Columbia, Virginia and West Virginia has been placed with the White Automobile Company. This firm is also representative for the White cars in this section. The company is making a number of changes at its location, Mount Royal and Guilford avenues, Baltimore, Md., including a more spacious showroom.

Adams Leaves Marseilles Company—C. H. Adams, for many years secretary-treasurer and general manager of the Marseilles Manufacturing Company, of Marseilles, Ill., has severed his connection with the company to accept the position of general director of purchases with the Western Implement & Motor Company, of Davenport, which recently took over the Colby Motor Company, of Mason City, Ia.

M. A. Newmark Company Move—The M. A. Newmark Company, the largest user of heavy-duty trucks in Los Angeles, is just about to move into the new building which has been especially equipped to handle freight on motor trucks. The bodies of the company's machines are made in two parts; the trucks are backed into the platform under overhead tracks, which have cranes that lift the bodies off and carry them to the various departments for loading. Another loaded body is dropped on the chassis and the truck is on its way without delay. In this way the trucks are kept moving and do their full share of work.

Pullman Agency in Syracuse—Pullman cars are to be handled in central New York territory during 1912 by the Acme Garage Company, Inc., East Water street, Syracuse, N. Y.

New Regal Showroom on Broadway—The Regal agency has moved into new quarters at 1668 Broadway, next door to the showroom it formerly occupied with the Abbott-Detroit.

Archer Brothers Take Marathon Car Agency in Seattle—The Archer Brothers have taken the agency for the Marathon cars in Seattle. Harry McKnight has taken the position of sales manager.

Gilbert Joins Portland Stoddard-Dayton Company—S. S. Gilbert, formerly connected with the Packard agency at Vancouver, B. C., has joined the Portland branch of the Stoddard-Dayton Auto Company.

Michigan Car in Tacoma—The latest touring car to be added to Tacoma's automobile row is the Michigan 40. It will be handled by the Electric Garage, 218-220 St. Helens avenue. W. A. Shumaker is manager.

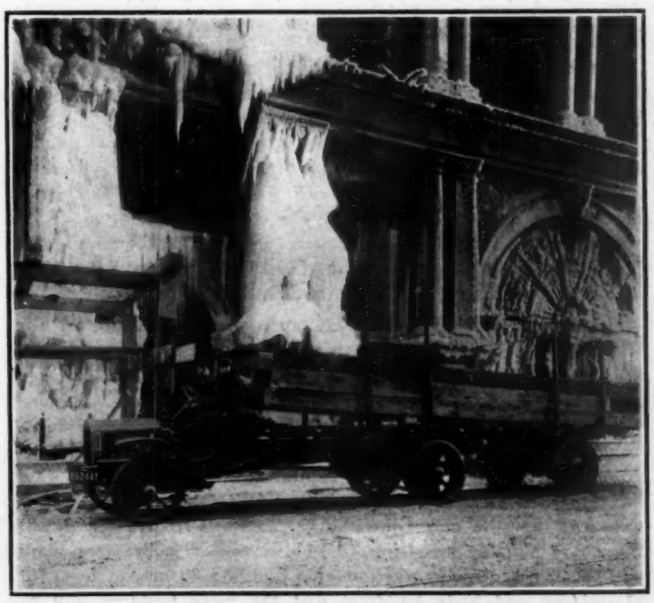
Tacoma Auto Dealers to Exhibit—Tacoma automobile dealers will exhibit February 7 to 17 at the Manufacturers' Food and Household Exhibition. It has been several years since Tacoma has had any sort of automobile show.

Olds Factory Branch in Los Angeles—The Olds Motor Works have recently established a direct factory branch in Los Angeles and installed D. L. Whitford as manager. A $20,000 stock of automobile parts will also be maintained.

Club Formed at Jeffersonville—Motor car interests of Jeffersonville, Ind., have organized the Jeffersonville Automobile Club and already plans have been made for a vigorous good roads crusade. The club has fifty charter members and officers as follows: President, John Schlueter; vice-president, William O. Sweeney; secretary and treasurer, Elmer M. Frank.

Atlanta Firms Move—The Cole Motor Company, of Atlanta, has moved to a new location on Peachtree street, between Harris and Cain. The Atlanta branch of the Stearns company and the Atlanta branch of the R. C. H. Corporation have moved into a new building at North avenue and Peachtree street. The Stearns company will have a service garage on North avenue in Atlanta.

Wallerich Leaves Mais Company—C. H. Wallerich, general sales manager of the Mais Motor Truck Company, has resigned. It is understood that he has accepted the position of manager of the automobile department in the newly organized General Industrial & Manufacturing Company, recently incorporated at Indianapolis, with a capitalization of $1,000,000, to manufacture delivery wagons and other motor trucks of 1,000 and 1,500 pounds capacity.



White trucks were early on the spot after the recent Equitable fire, carrying lumber to shore up the walls

White Timber Trucks Prove Worth—Clearing away the ruins of the Equitable building, New York City, since the big fire is being materially assisted by the use of a number of automobile trucks. Several cars made by the White company have been engaged in this labor and demonstrated their efficiency. The contractor in charge of the work found that one of the walls was in dangerous condition and that some heavy timbers were needed to shore up the tottering masonry. Sixteen 30-foot beams, weighing almost 8 tons, were loaded on one of the trucks and delivered in 2 hours over a route 3 miles long through heavy traffic and slippery going. Two more loads were delivered before 3 hours more had elapsed. The contractor in giving the order thought that horses would have to be employed and allowed 6 hours for one trip. Instead he received his timber in 2 hours.

Automobile Incorporations

AUTOMOBILES AND PARTS

Chattanooga, Tenn.—Nyberg Auto Works; capital $100,000; to make automobiles. Incorporators: H. Nyberg, Z. T. Patten, J. P. Winn, G. H. Miller.

Chicago, Ill.—Cartercar Motor Car Company; capital $10,000; to deal in automobiles and parts. Incorporators: W. R. Watson and others.

Cleveland, O.—Parish & Bingham Company; capital increased from $1,000 to $224,000; to make automobile frames. Incorporators: J. Scott, W. Cairns, A. D. Morse, S. J. Wainwright.

Detroit, Mich.—Barber Motor Sales Company; capital $6,000; to sell automobiles.

Lansing, Mich.—Brownwall Engine & Pulley Company; capital, $25,000; to make automobile parts. Incorporators: Homer D. Parker, E. A. Brown, F. A. Wall.

Morgantown, W. Va.—Maxim Tricar Company; capital $50,000; to make and sell automobiles. Incorporator: A. A. Hall.

New York City.—George Breuning, Barlow & Company, Inc.; capital $5000; to sell automobiles. Incorporators: A. B. Barlow, L. Breuning.

New York City.—H. & B. Auto Sales Company; capital $5,000; to sell motor cars. Incorporators: Chas. G. Heywang, G. J. Burger, S. H. Jones.

New York City.—Hastings Spring Company, Inc.; capital $10,000; to manufacture automobile springs. Incorporators: W. T. Brown, J. D. Brown, W. H. Richardson.

New York City.—International Automobile Company; capital $10,000; to sell automobiles. Incorporators: R. K. Haas, H. B. Ham, G. C. Haas.

New York City.—Requa European Motor Company; capital $10,000; to manufacture automobile motors. Incorporators: L. F. Requa, F. Charavay, E. S. Beach.

New York City.—Automobile Hauling Company; capital $3,500; to do an automobile trucking business. Incorporators: A. Lurie, H. Caplan, H. Backer.

Seymour, Conn.—Seymour Auto Company; capital $6,500; to sell automobiles. Incorporators: M. L. Warner, T. S. Coleman, E. S. Clark.

St. Louis, Mo.—Universal Motor Truck & Traction Engine Company; capital $250,000; to do a general motor traction engine business. Incorporators: W. H. Taylor, J. Beltram, A. R. Shaffer.

GARAGES AND ACCESSORIES

Brooklyn, N. Y.—Advance Rubber Company; capital $150,000; to manufacture automobile tires and rubber goods. Incorporators: F. H. S. Hyde, A. Lublintz, C. Pinney.

Brooklyn, N. Y.—Greenpoint Taxicab Company; capital $10,000; to engage in the taxicab business. Incorporators: C. W. Hoppins, C. E. Keller, S. I. Kelton.

Camden, N. J.—Starn Tire Manufacturing Company; capital $500,000; to manufacture automobile tires, etc. Incorporators: G. E. Starn, G. M. Cline, W. C. Mayne.

Chicago, Ill.—Dewey Garage Company; capital $3,000; to deal in automobiles and engage in the garage business. Incorporators: A. C. Mabee, J. A. Martinkus, T. B. Brown.

Chicago, Ill.—Thermoid Rubber Company; capital $300,000; to make mechanical and rubber goods. Incorporator: E. C. Ferguson.

Cincinnati, O.—D. M. Cooper Company; capital $10,000; to manufacture an automatic automobile starter and a patented shaking boiler grate. Incorporators: H. L. Hagerman, C. E. Dornette, G. A. Dornette.

Dallas, Tex.—Firestone Tire & Rubber Company; capital $10,000; to deal in automobile tires. Incorporators: P. B. Talbot, E. D. Manley, J. T. Stewart.

New York City.—Motor Car Appliance Company; capital $5,000; to manufacture and deal in automobile accessories. Incorporators: R. J. Randolph, Jr., A. I. Smith, Jr., J. B. Spencer.

New York City.—St. Nicholas Garage & Taxicab Company; capital $10,000; to engage in the garage and taxicab business. Incorporators: D. Rohan, G. J. Wider, H. Henrich.

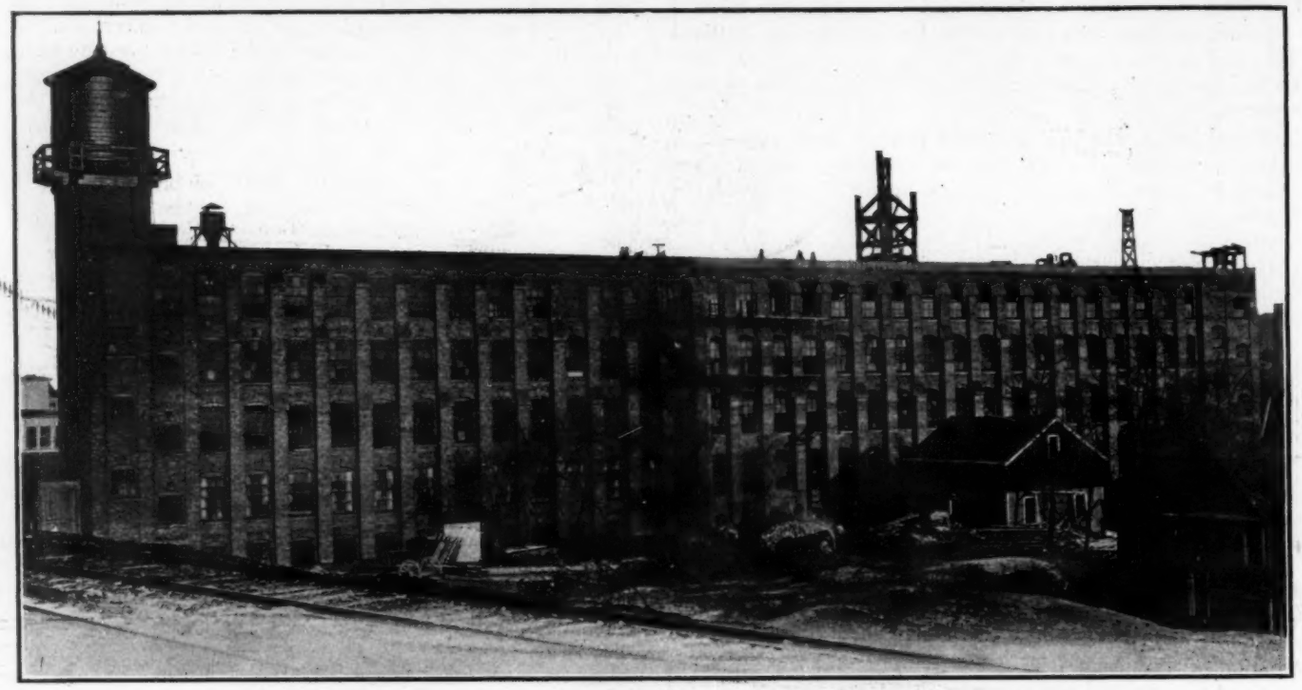
Poughkeepsie, N. Y.—Van Benshoten Motor Cab Company; capital $5,000; to engage in the taxicab business. Incorporators: J. Van Benshoten, H. A. Storm, C. G. Gardner.

Racine, Wis.—Specialty Brass Company; capital $25,000; to manufacture brass and aluminum specialties, lamps, etc. Incorporators: H. Anderson, C. Anderson, L. Thompson.

Syracuse, N. Y.—Syracuse Auto Supply Company, Inc.; capital $25,000; to deal in automobile accessories and supplies. Incorporators: B. R. Newhall, C. A. Benjamin, F. H. Maynard.

St. Louis, Mo.—Victor Buggy & Auto Top Company; capital $2,000; to deal in buggy and automobile tops. Incorporators: O. E. Carter, R. F. Perdue, F. Roband.

OF INTEREST to the INDUSTRY



Factory building recently added to the plant of the F. B. Stearns Company at Cleveland, O.

STEARNS COMPANY'S NEW BUILDING—The new building of the B. F. Stearns Company, of Cleveland, O., more than doubles the floor space and production capacity of the company's machine shops. The rapid increase in the business of the company made the old shops inadequate. The new structure was completed in record-breaking time, the contractors working night and day, Sundays and holidays so that it might be completed and ready for occupancy by February 1.

Luverne Company Growing—The Luverne Automobile Company stockholders have voted to increase capital and enlarge the factory at Luverne, Minn. A large part of the stock was subscribed at the meeting.

Badger Brass Plant Growing—The Badger Brass Manufacturing Company, of Burlington, Wis., is making extensive improvements in its big works which will increase the capacity 40 per cent. The factory has been working day and night shifts.

Dowagaic Joins Tulsa—The Dowagaic Motor Car Company, of Dowagaic, Mich., has moved to Tulsa, Okla., and is now a part of the Tulsa Automobile & Manufacturing Company, of Tulsa. The Tulsa company will manufacture trucks, and expects to make the first deliveries about April 1.

Olds to Open New Building—The Olds Motor Works, Lansing, Mich., will open its new northwestern branch building at 1629 Henepin avenue, February 10. The building and equipment cost $100,000. The building is three stories, with offices on the ground floor, showroom on the ground and second floors, garage on the ground floor, and stockroom on the second. The shop is on the third floor.

Wichita Falls Company's Big Order—The Wichita Falls Motor Company, of Wichita Falls, Tex., which established a factory here for the manufacture of motor trucks a few months ago is preparing to make extensive additions to its plant in order to increase its output. The company received an order for 150 motor trucks a few days ago, the amount of money involved in the order being $275,000. The factory is now turning out the trucks at the rate of five a day. This number will soon be more than doubled, it is announced.

New Engine Company—The Gifford Engine Company, of Lansing, Mich., has filed articles of incorporation with the Secretary of State, the capitalization of the concern being $50,000. The company will manufacture small gasoline engines for automobiles and launches. The factory will be located on East Shiawasse street. About thirty men will be employed. At the present time, it is stated the concern has orders for about 300 engines. The officers of the company will be as follows: President, W. Arthur Gifford; vice-president, R. N. Wilson; secretary, J. K. Reed; treasurer, Frank L. Radford.

Stevens-Duryea Buys Land—The growth of the Stevens-Duryea Motor Company, of Chicopee Falls, Mass., is evidenced by the recent purchase of 40 acres of land at East Springfield, Mass., upon which will be erected a series of factories in the near future. The first one will be ready for occupancy June 1, and will be four stories high with a length of 500 feet by a depth of 80 feet. This will give the company a floor space of 160,000 square feet. The company will erect other buildings later. The plant is on the line of two railroads and will give it ample facilities to ship its cars away without any delays.

Lauth-Juergens Company Expands—At a meeting of the stockholders of the Lauth-Juergens Motor Car Company, held at Fremont, O., this week, it was decided to expend a large amount of money in new equipment and additional buildings. Several thousand dollars were subscribed by present stockholders and their friends who attended the meeting. It is expected that the balance of the capital stock will be sold within the next few days and a new issue of $150,000 ordered. It is expected that the new Gibsonburg plant will be 200 feet by 60 feet, with suitable provision for additions. The Fremont plant will at once begin the erection of a building 80 by 250 feet, for assembling and body building, and the main building will be used for a machine shop only.

AUTOMOBILE AUTOMOBILE

PATENTS GONE TO ISSUE

TRANSMISSION GEARING—Of the selective speed type of construction.

4. This patent, Fig. 1, refers to the combination with a driving and a driven shaft, of a sleeve which is loosely mounted on the former and clutch means for connecting and disconnecting the sleeve with the shaft. The driven shaft carries two gears actuated by two driving gears which are mounted on the above-mentioned sleeve. The driving gears are secured against rotation relative to the sleeve and they can be moved into and out of mesh with their respective driven gears. Adjacent to the driving shaft a countershaft is supported on which a sleeve is mounted; to the sleeve is secured a pinion adapted to be engaged by one of the driving gears when the latter is moved to its outermost position. On the last-mentioned sleeve is also slidably mounted a second pinion held against rotation relative thereto. This last pinion may be moved into and out of mesh with one of the driven gears. The driven gears are spaced away from the above-mentioned clutch member and the first pinion is spaced away from the driven gears. Thus one of the driving gears may be moved into a neutral position between its driven gear and clutch member, while the other driving gear may be moved into a neutral position between its driven gear and the first pinion.

No. 1,013,565—to Edwin F. Price, assignor to the Ohio Manufacturing Company, Upper Sandusky, O. Granted January 23, 1912; filed February 2, 1911.

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Liquid Measuring Tank—A vessel for holding liquids combined with an indicator of the volume contained.

1. This device comprises a casing around the sides and bottom of which extends an air cell, cooled by contact with an ice chamber. The air cell is formed by the casing and the ice chamber, brackets projecting inwardly from the latter. A reservoir is supported on these brackets and has independent measuring cells in its bottom; it also carries discharge tubes projecting through the casing, exteriorly thereof, to permit the delivery of the contents of the measuring cells. An auxiliary bottom is formed in the reservoir, being spaced at the lower end of the latter and having a valve seat which normally closes the opening mentioned.

No. 1,015,636—to Joseph Riepp, New York, N. Y. Granted January 23, 1912; filed May 16, 1911.

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Tire—Carrying a detachable tread on overhanging flanges.

1. The tire, Fig. 2, referred to in this patent comprises a body part and a detachable tread. The body is yieldable and has upwardly extending overhanging side flanges, and the tread consists of a number of relatively thin, vertically extending layers of a resilient material, having a circumferential cut-out portion in each side, so that it forms a projecting tongue to engage under the overhanging flange of the body part. In this way is provided an oppositely extending tongue which lies over the upper surface of the flange. Rods extend through the body flanges and the various layers of the tread and means are provided for adjusting these rods lengthwise, thereby binding the body part flanges to the tread part and compressing the layers.

No. 1,013,596—to Alfred Freschi, Chicago, Ill. Granted January 23, 1912; filed July 8, 1908.

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Vehicle Spring—A combination of spring and shock-absorber principles.

This patent covers a spring construction, Fig. 3, comprising an axle-engaging member, to the opposite ends of which bell-crank levers are pivoted. Each lever is formed with a long and a short arm, the shorter arms extending below the axle. A load-supporting compression spring set is located between the depending shorter arms, and the bell-crank levers have also abutment arms which extend above the axle. A compression rebound spring set is stationed between the abutment arms; one bell-crank lever has integral spring seats on its short arm and its abutment arm, while the other bell-crank lever carries adjustable spring seats on its arms, they being adapted to be tightened against the springs so as to prevent their displacement.

No. 1,013,577—to Frank Wheeler, Orange, Cal. Granted January 23, 1912; filed July 5, 1910.

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Headlight-Turning Device—Apparatus for altering the direction of headlight beams.

3. This device embodies an actuating rod on which a drum is loosely mounted. There are some means for imparting an initial movement to the drum independently of the rod and for subsequently compelling the simultaneous movement of the rod and drum. There is a lamp-supporting post mounted on a support and an operative connection between post and rod.

No. 1,014,627—to Raymond G. Gaskill, Port Deposit, Md. Granted January 9, 1912; filed March 9, 1911.

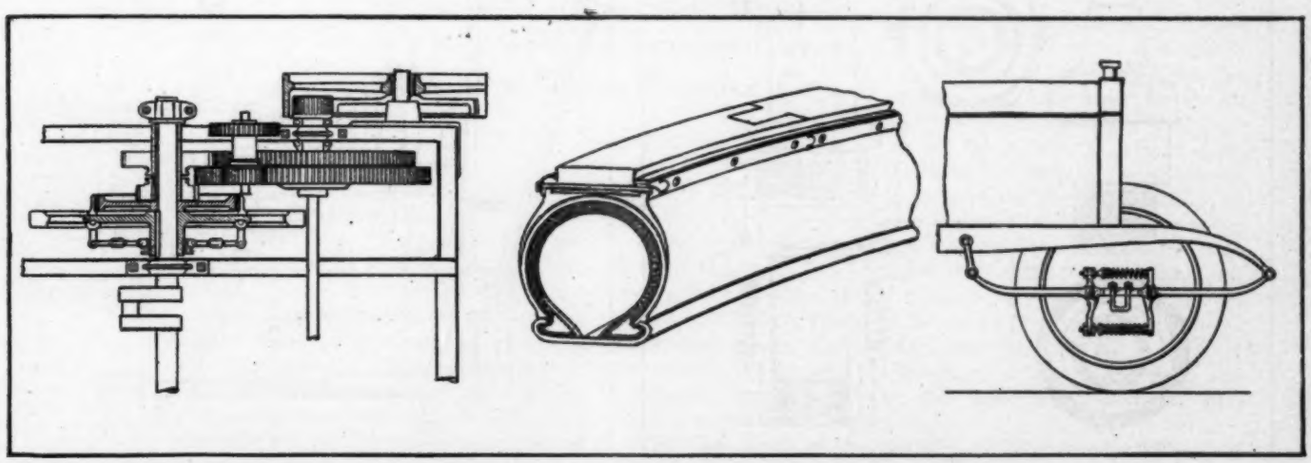

Fig. 1—Price transmission gearing. Fig. 2—Freschi tire. Fig. 3—Wheeler vehicle spring

AUTOMOBILE
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Newest Ideas Among the Accessories

Bosch and Black Eagle Spark-Plugs; Cotta Transmission, Etc.

Bosch High-Tension Spark-Plugs

BOSCH HIGH-TENSION PLUGS—The Bosch high-tension spark-plugs shown in plan and elevation in Figs. 1 and 2, consists of three parts, the central electrodes a one-piece insulator and a steel shell. The form of the electrodes is crescent, giving them a lower electrical resistance and producing a spark which is more or less in the form of a sheet of flame. In consequence of this form the spark jumps the gap at lower cranking speed than where it is rather ball-shaped.

The insulator part of the plug is made of steatite, which has special insulating properties and is neither brittle nor subject to deterioration by intense heat, extreme pressure or excessive lubrication. The unique character and strength of these insulators permit of doing away with all joints. This insures good insulation and gastightness and the plugs are guaranteed to withstand a pressure of 750 pounds per square inch. The Bosch Magneto Company, of 225 West Forty-sixth Street, New York City, is the maker of this plug.

Black Eagle Plugs Very Simple

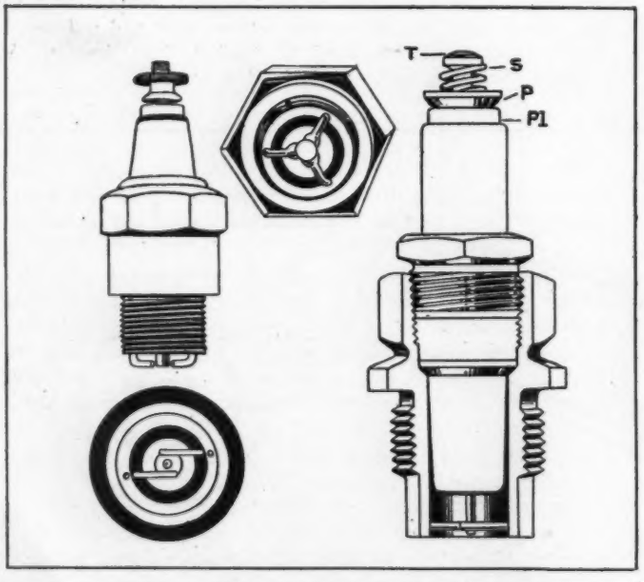
This spark-plug, illustrated in the accompanying Figs. 3 and 4, is notable for its simplicity. The section shows that it consists of very few parts, namely a porcelain core, a metal shell and brass bushing. The porcelain core carries a vertical sparking-point crossed by two horizontal electrodes. The vertical electrode is connected to the terminal T, which is stationary. A spring S between T and the plate P presses the latter down, but it may be lifted and the wire from the magneto may be wound around the terminal stem to go between P and the part P1. This arrangement insures positive connection, and the wire cannot come off. The plug is made by the Progressive Manufacturing Company, whose factory is at Torrington, Conn.

Cotta Transmission and Gearset

The Cotta Transmission Company, Rockford, Ill., builds the type of gearset which is illustrated herewith in Fig. 5. This gearset is of the selective type, giving three speeds forward and one reverse. To prevent clashing and consequent stripping of the gears, a set of jaw clutches is provided on the faces of each speed-change gear, the clutches being loosely journaled on the driven shaft. Two corresponding double sliding clutches are mounted on squared portions of the driven shaft, by which any one of the speed-change gears may be locked on the shaft. Each set of clutches has an aggregate parallel working-face of 21-2 inches to withstand the shock and strain of changing speeds. On the direct drive the main and lay shafts are locked together, the gear mounted on the countershaft being thrown out of mesh. On high speed the drive is direct with all gears and countershaft idle. When the sliding clutch is brought into neutral the countershaft gear drops back automatically. The transmission set is furnished with right, left or center control. The second arrangement is illustrated in Fig. 5.

Tirenew Preserves Tire Casings

The National Rubber Company, of St. Louis, Mo., makes Tirenew, a solution of rubber which is smeared over the surface of the tire casing. This has the effect of filling up and cementing all small cuts and holes in the casing. The compound dries within half an hour, leaving a coating of pure rubber on the places treated. Because the solution changes the appearance of a tire treated with it to that of a new casing, the company advocates its use for reasons of beauty also, and the pleasant odor of Tirenew should also make its use attractive. The compound comes in neatly finished cans containing 12 ounces, as well as in strong and compact pails for 1 quart, 1-2 gallon or 1 gallon.



Figs. 1 and 2—Bosch plug. Figs. 3 and 4—Black Eagle plug

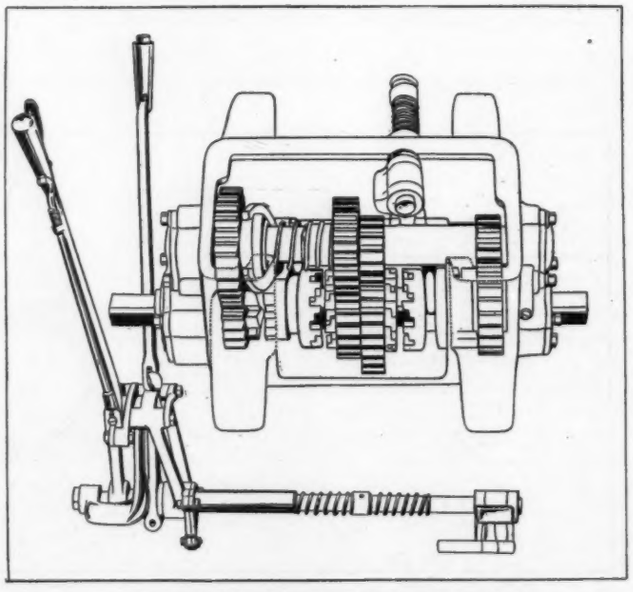


Fig. 5—Gearshift lever and Cotta transmission